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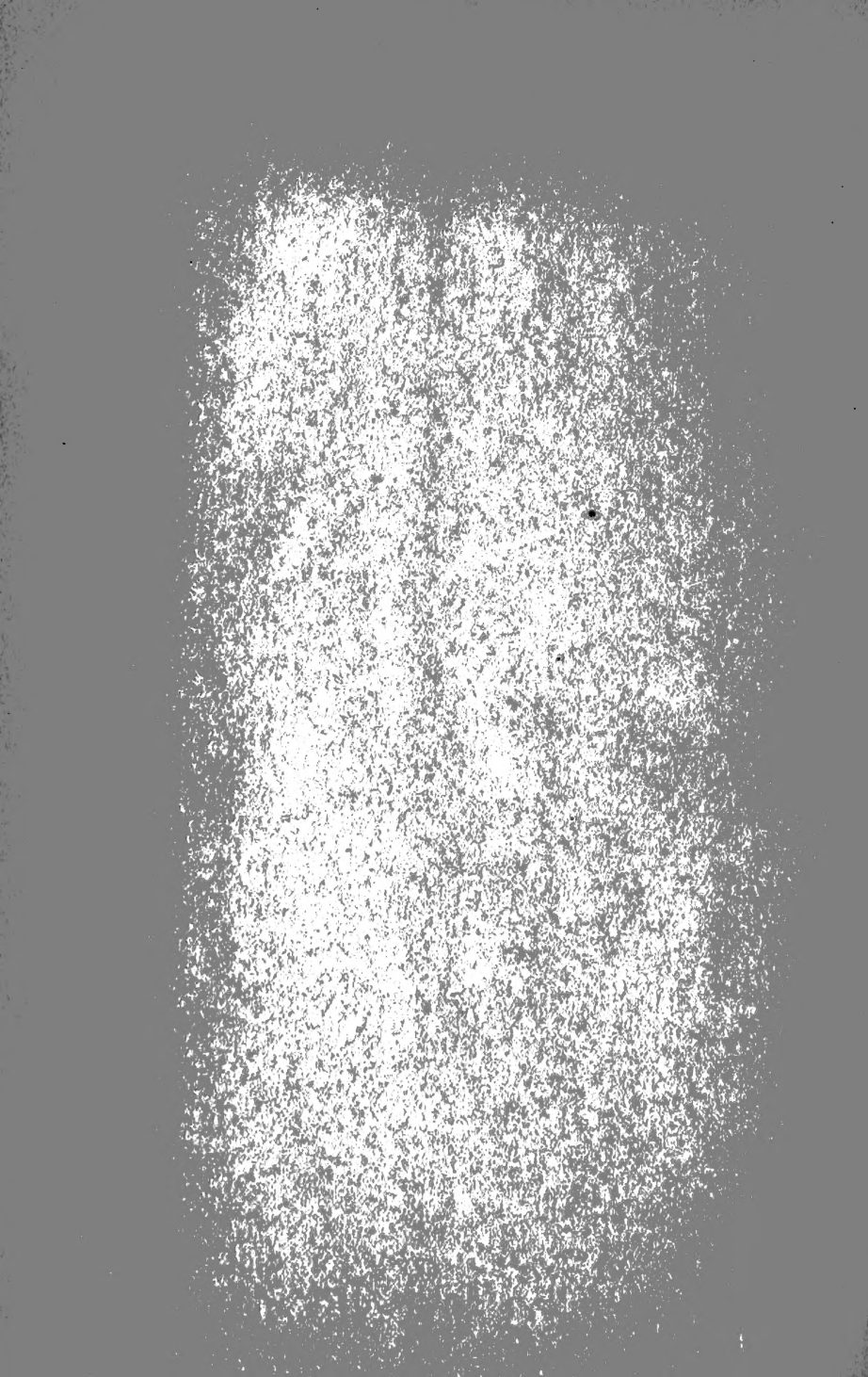
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THE CANADIAN
ENTOMOLOGIST.

 VOLUME VIII. 

Edited by William Saunders,
London, Ontario.

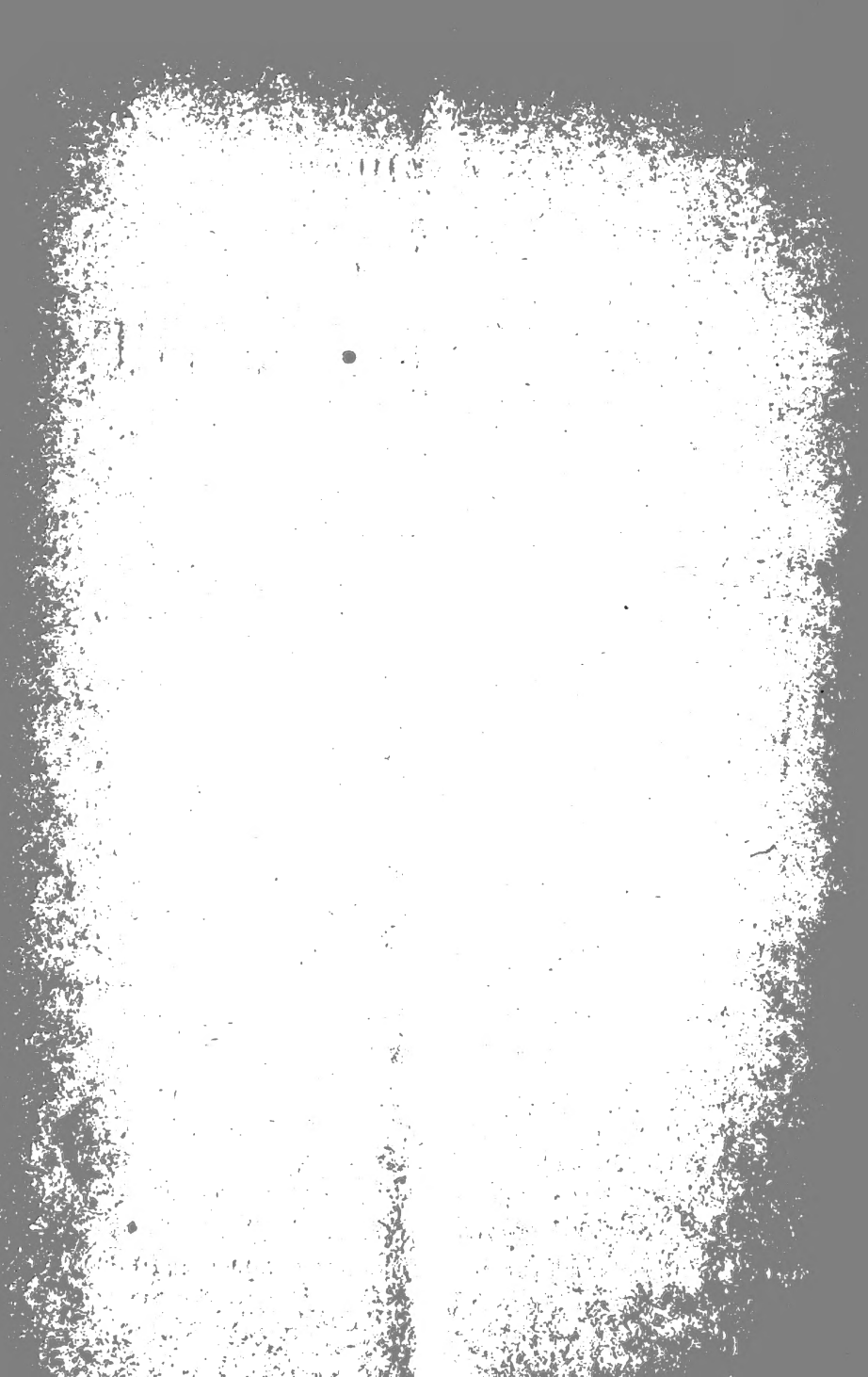
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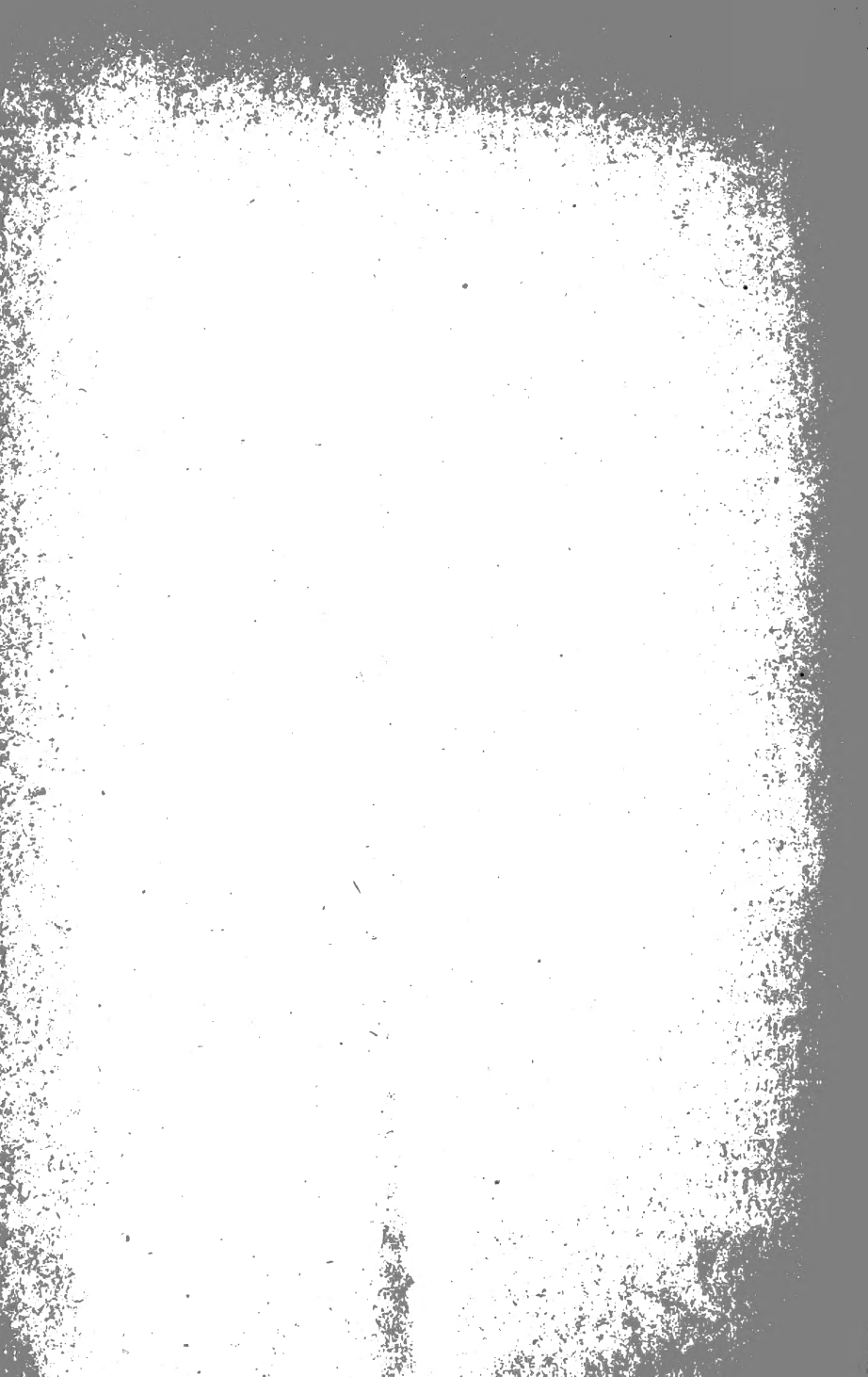
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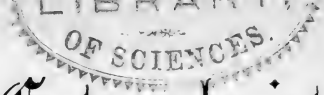
1876



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The Canadian Entomologist.

VOL. VIII.

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No. 1

ANNUAL ADDRESS

OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1875.

To the Members of the Entomological Society of Ontario:—

GENTLEMEN,—For the fifth year in succession I find myself called upon, as your President, to address a few words to you on the condition of our Society, and on the subject of Entomology in general.

With regard to the Society, you have already learnt from the satisfactory Reports of the parent organization and its various Branches, that it continues to go on prospering in a quiet, unostentatious way. While there has been no marked increase to our list of members during the past year, and no performance of any work of unusual importance, yet it is a matter of congratulation that we have no falling off either in numbers or resources to deplore. Much of the inactivity in Entomological matters that has been apparent in this country during the past year may no doubt be ascribed to the prevalent "hardness of the times," which has occasioned—even to those least affected by it—much anxiety of mind, conjoined very often with increased absorption in the cares of business or in the labours necessary for obtaining a livelihood. As you are well aware, we have in Canada but very few persons of assured wealth, who are able, as in older and richer countries, to devote their abundant leisure to literature, art or science. Consequently the condition of things in the world about us deprives most of our members of the leisure, if not also of the inclination, requisite for the successful pursuit of Entomology in any of its various phases. Before another winter opens upon us, however, we have reason to believe that the worst of the present financial storm will be over, and that renewed confidence and prosperity throughout the country will remove the gloom and dullness now oppressing almost every department of work among us. With a revival of business, we may assuredly look for a restoration of activity in scientific pursuits, and hope that our Society, in common with others of a kindred character, may be distinguished by large accessions to its numbers, and by increased work in all its departments.

Last year, at our annual meeting, I took the opportunity of calling your attention to many fields of Entomological labour that are now all but unexplored in this country. May I repeat that there is ample scope for the exertions of all our members, whether they care only to form collections of specimens, or prefer to devote their labours to the unfolding of the life-histories or the study of the classification of insects? There is plenty of work remaining to be done even in the favourite orders of Lepidoptera and Coleoptera, to say nothing of the others that are not so generally studied or collected. It would be a valuable contribution to our store of knowledge were lists of the Canadian species of all orders of insects to be formed, and presented to the Society for publication; and at the same time a revision made of those published some years ago.

But not only is there scientific work of this kind to be performed, which will require generations for its complete achievement; there comes before us at the present moment an extraordinary object for accomplishment during the approaching winter—I allude to the representation of the Society by means of a collection of Canadian insects at the approaching Centennial Exhibition at Philadelphia. You will all, I think, agree with us in the belief that it is a matter of great importance to the Society that it should be brought in this way before the notice of the world, and that it cannot but be of some benefit to the Dominion that its Natural History, as well as its industrial resources, should be fully exhibited. The Council of the Agricultural and Arts Association have already, on our behalf, brought the matter before the Commissioners appointed by the Government, and we understand that a sum of money will be provided to aid us in the satisfactory performance of the work. To gather together a fitting collection of insects, and to prepare them for exhibition, is a task that will strain to the utmost all the resources of the Society. We have commenced the work relying upon the co-operation of you all, and now we trust that every one will help us by the loan of specimens and any other aid that can be afforded. The Society is committed to the task; let us see to it that there be no failure!

Before turning from matters immediately affecting our Society, I may mention that our periodical, *THE CANADIAN ENTOMOLOGIST*, continues to be maintained with undiminished efficiency and interest, being largely supported and contributed to by our Entomological brethren of the United States; and that the last ANNUAL REPORT presented by the Society to the Legislature has been received with more than usual marks of favour by the press, scientific, agricultural and political, not only in

Canada and the neighbouring States, but also in England ; we have been naturally gratified to observe that in many instances copious extracts have been made from its pages, and even a whole article reprinted in an English scientific magazine.

Having referred thus far to our Society and the things that especially concern it, let me now say a few words regarding Entomological matters in general. At the Annual Meeting of the American Association for the Advancement of Science, held in August last, at Detroit, Michigan, the general Entomological Club, organized last year at Hartford, met for the first time. Its sessions, held daily throughout the week of meeting, were remarkably interesting. They were presided over by Dr. LeConte, undoubtedly the greatest of living American Entomologists, and were attended by a great majority of the noted Entomologists of this continent. Our own Society was most efficiently represented by our able Editor, Mr. Saunders ; I much regret that the pressure of business matters at home prevented me from accompanying him, as I fully intended to have done. As a complete report of the proceedings is being published in the CANADIAN ENTOMOLOGIST, I need not detain you by any account of them here. Next year the meeting is to be held at Buffalo, N. Y.—a place even more convenient of access for Canadians than Detroit. We trust that a large number of our members will avail themselves of this opportunity—which may not occur again for many years to come—of attending the sessions, and making the personal acquaintance of our American brethren. From past experience I can assure them of a hearty welcome, while no one can doubt that more valuable information can be acquired in a few days in an assemblage of this kind than can be obtained in years of solitary work.

During the season that is now all but brought to a close, there has occurred nothing of a very startling or unexpected character. The Colorado Beetle has continued to extend his ravages throughout our country, but he has been met by such a determined and universal resistance that his work of devastation has been hardly appreciable ; certainly in the central portion of this Province we have never had a finer crop of potatoes both as regards quantity and quality. The Cabbage Butterfly (*Pieris rapæ*), to which I also referred last year, has been rapidly extending to the west, and has already become a common object in the neighbourhood of London. So closely, however, does its parasite (*Pteromalus puparum*) follow in its wake, that where a year ago it was most destructive to all its food-plants, it has this season wrought but a

moderate amount of danger. The Locusts, or Grasshoppers, of the West (*Caloptenus spretus*), have continued to commit much havoc, though not by any means on the frightful scale of last year; there is every prospect that the destitution and suffering then occasioned by them will not be repeated to any very great extent this year.

While there has been upon the whole a decided diminution in the amount of loss occasioned by noxious insects during the past year, we have nevertheless to record an increase in the numbers and consequent power for evil, of several common species that are always more or less abundant; among the most notable I may mention the Army Worm (*Leucania unipuncta*), which has wrought much damage in the Maritime Provinces of the Dominion, as well as in some portions of the United States; the two species of Tent-Caterpillars (*Clisiocampa Americana* and *sylvatica*), which have been excessively abundant and destructive to fruit and forest trees in many parts of this Province; and the Pea Weevil (*Bruchus pisi*), which we much fear may soon become—unless measures are taken to prevent it—a source of great loss to our agriculturists. These I mention as having had a more than usual manifestation this year, but I need not detain you with any account of the ordinary work of our insect friends and foes, which are so familiar to every one in this country.

As I mentioned at the outset, you have done me the great honour of electing me your President for five years in succession; while I thank you most cordially for your kindness and consideration so repeatedly shown to me, I feel that it is only reasonable that I should now make way for some one else, who may be able to devote more time and energy to the interests of our Society, and be of more real use to it than I have latterly been capable of. I beg, therefore, to resign into your hands the office that you have so long honoured me with; at the same time I desire to say that I shall continue always to have the welfare of the Society at heart, and that I shall ever be ready and willing to do all that lies in my power to advance its best interests. Again offering you my respectful thanks,

I have the honour to be, gentlemen,

Your obedient servant,

CHARLES J. S. BETHUNE.

Trinity College School, Port Hope, September, 1875.

NEW TEXAN MOTHS.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Parasa incisa, n. s.

♂. This species has the fore wings and thorax of a soft brown. The primary is covered by a pea-green patch, which does not reach the margins and is defined outwardly by a narrow dark line running once deeply inwardly below vein 2 and slightly opposite the cell. Hind wings light yellowish. It appears to be allied to *paenulata* Clem., unknown to me, but differs by the shape of the green patch and in its not being bordered with white. The thorax in *P. chloris* is grass green. Expanse 21 m. m. Bosque Co., Texas (Belfrage, No. 554.)

Euerythra phasma, n. g. et sp.

♂. The insect is allied to *Spilosoma*, but the head is more prominent, the wings narrower and the antennæ more continuously pectinate. The neuration has not been studied of this form, which is so distinctly marked as to be at once recognized, and which I do not find in authors. White. Fore wings white, crossed by a broad irregular blackish band from base to extremity of veins 3 and 4, where it retains the otherwise white fringes. From apices to middle of external margin a second band diagonally crosses the wing. A discal black spot and traces of an extra basal band. Everywhere, where the blackish color obtains the veins are bright yellow, as is the submedian fold. Body above crimson whitish at base. Thorax and head above white. Squamation about the eyes crimson. Anterior legs fuscous outwardly; palpi fuscous. Beneath, the white secondaries show a dot. Expanse 38 m. m. (May 5, Belfrage, No. 471).

Litodonta, n. g.

Allied to *Heterocampa* of Doubleday. It differs by the antennæ being pectinate in both sexes. The thorax is more brushily tufted behind; the head more appressed; the abdomen shorter.

Litodonta hydromeli, n. s.

♂ ♀. Fuscous, overspread with pale green on primaries and thorax. Basal and sub-basal spaces powdered with orange scales; subterminal line followed by orange scales. Lines distinct, widely geminate, sinuate,

sub-lunulate ; space beyond the black discal streak clear fuscous. Fringes pale cut with fuscous, opposite the ends of nervules ; terminal line distinct. Hind wings pale at base, smoky outwardly ; beneath fuscous, with distinct terminal lines and fringes cut with fuscous. Thorax lined with black on tegulæ and collar. Expanse 34 m. m. May 7, Belfrage, No. 246.

I describe the type of this genus, the only one of the species which has the orange shadings. A paper is being prepared with a plate of the species, which are difficult to separate without illustration.

Aletia hostia, n. s.

Smaller than *argillacea*. It differs by the stigmata being expressed by white dots, of which two super-posed, express the reniform. The ordinary lines are very narrowly white margined, appearing guttate. Hind wings blackish ; fore wings darker than in *argillacea*. The t. p. line is at first sight more distinct than in its common ally. Easily recognized by the above characters. Belfrage, No. 535.

Caradrina conviva, n. s.

A small species of the size of *grata* (*rasilis* Morr.) Palpi black at the sides. Pale yellow brown, or fawn color. Lines dotted. T. p. line widely geminate. Subterminal line a blackish shade. Fringes blackish. T. a. line incomplete, strongly dentate. Reniform ill defined ; a blackish shade above it on costa indicates the median shade ; a dot indicates the orbicular. Terminal line black, interrupted. Hind wings white, glistening, immaculate, beneath stained along costal region and above here a little tinted. Thorax and head above like fore wings, abdomen pale. Expanse 21 m. m. Belfrage, No. 539.

Mamestra brachiolum, n. s.

♂ ♀. Very near the Californian *M. cuneata* Grote, differing as follows : There are no yellow shades beyond the subterminal line, which is more distinctly waved in the female ; the claviform is present, absent in its ally ; the thorax is purely fuscous and the whole insect darker than in the Californian species ; in the male at least the orbicular is more rounded, the t. p. line is straighter, not inwardly bent below the median vein, hence the lines are inferiorly wider apart than in *cuneata*. Else the two species are very similar. Expanse 28 m. m. Belfrage, No. 102. In this species the ovipositor is concealed as in *cuneata*.

Catocala Belfragiana Harvey. Bull. B. S. N. S., 2, 281.

I learn that this species is the same as *C. jocaste* of Mr. Strecker. My paper was read Feb. 5th, and printed in February. I do not think as early a date can be shown for the Number of Mr. Strecker. This species extends to Kansas (Prof. Snow); I have vainly tried to identify it with the unknown *messalina* of Gueneé.

NOTES ON BISTON URSARIA WALKER.

BY G. J. BOWLES, MONTREAL, P. Q.

This moth, which is very common in and about Montreal, is described by Walker, in a paper by W. S. d'Urban, published in Vol. 5 of the *Canadian Naturalist* (1860), entitled "A Systematic List of Lepidoptera Collected in the Vicinity of Montreal." It is also taken at Quebec, but I met with only two specimens there during several years' collecting.

The following is the description (of one sex only):

"Male. Dark cinereous, speckled with black, very robust and pilose. Antennae very broadly pectinated. Thorax with three black bands. Legs densely tufted. Fore wings with four black oblique lines, first line bent, second and third approximate, slightly undulating, diverging towards the costa, fourth diffuse. Hind wings with first line obsolete, second and third apparent, fourth indicated by a short broad streak near the interior angle. Length of body 8—9 lines; expanse 22—24 lines."

The female is generally larger, less distinctly marked, and the wings are more transparent. Antennae filiform.

The English species (*B. histaria*) stands on our list as a native of Canada, but I have not met with it. The habits of the two species are very similar, and the caterpillars resemble each other closely; indeed, were it not for the difference in color and markings between the perfect insects, they would no doubt be considered identical. The description of the larva of *histaria* given by Newman, in his "Natural History of British Moths," would answer equally well for that of *ursaria*, and its

habits are similar to those of the latter. It sometimes occurs about London in such numbers as to strip the trees of their leaves, and the moths are taken in the squares of that city, sometimes twenty or thirty on one tree.

The Champ de Mars, Montreal, is a favorite breeding place of *ursaria*. The Lombardy Poplars growing in this locality are infested with them year after year. In some seasons the trees are partially defoliated by the larvæ, and during the last week of April and the first of May the moths are to be found in great numbers. This year they were a little later than usual. On the 5th May I first observed them, many having just emerged from the pupa, and resting on the tree trunks with unexpanded wings. On the 6th I brought home two females, and placed them in boxes to obtain the eggs. Two days afterwards each had laid about two hundred eggs of a bright green color, globular, and without markings under a low microscopic power. They were .04 in diameter, and laid (in each case) principally in the narrow opening between the lid and side of the box. The female has an ovipositor which can be extended at least a quarter inch, for the purpose, perhaps, of laying her eggs in the interstices of the bark, as they are deposited some time before the leaves expand. About the nineteenth day the eggs changed color, and became steel blue. On the 29th May they began to hatch out, just as the poplars were expanding their leaves. The larvae were very active, and from the first had the peculiar geometric habit of resting now and then with the body extended full length in the air, supported only by the claspers. I turned them out on a young plum tree, and they soon began to feed freely, and grew rapidly. Strange to say, they quickly diminished in numbers, and but few reached maturity.

New-born larva.—.12 inch long, black, head large, with a few whitish hairs; front edge of first segment bordered with white, second and third with white spiracles; next five segments have two white spots on back, one on each side around spiracles, with another white spot below. Legs black; body beneath black.

Mature larva.—2 to 2.50 inches long, general color drab or dingy purple; head of a lighter shade, and spotted with black. First segment bordered in front with a yellow line, indented behind; fourth to eighth inclusive, each with six very small yellow tubercles, two on back, one behind and one below each spiracle. Body striped from head to tail with twelve reddish lines, each bordered on both sides by an irregular

narrow black line ; six of the reddish lines are on the back and sides, one (interrupted) through the spiracles, and four on abdomen. Anal segments spotted with black, as also first, second and third segments. Mouth pinkish, legs pink, spotted with black ; spiracles dark colored.

It will be seen that the larva changes but little during growth. At the end of July they descend and bury themselves in the earth, changing in a few days to pupae, without forming any case. The pupa is brown, rather stout in form, and furnished at the tail with a small spine, which is generally bifid. It much resembles that of *Amphidasys cognataria*.

NEW SPECIES OF ACRIDINI FROM NEBRASKA.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Pezotettix junius, n. s.

Frontal costa slightly sulcate below the ocellus in the ♂. Merely depressed at the ocellus in ♀.

Median carina of pronotum slight, cut by the last transverse incision behind the middle, the anterior part slightly arcuate. Lateral carinae distinct only on the flat posterior lobe. Pronotum with sides slightly divergent ; obtuse angled behind. Elytra cover about two-thirds of the abdomen. Posterior femora as long as abdomen. Last segment in ♂ squarely produced. ♂ cerci broad, short, rounded at tip, slightly curved on upper edge. The lower edge bends upward, making an obtuse angle about the middle, from which point the cerci rapidly decrease in width.

Color of living insect—Varies with age from gray to green. Face and sides of thorax greenish gray. A broad black stripe from eye to last transverse incision of pronotum. Occiput brown. Pronotum brown with green stripe on each side. Antennae red, tips brown. Elytra brown, sometimes yellowish, with a few black dots along the disk. Hind femora light brown, usually with two oblique whitish bands on upper half. Three black spots on upper edge. Tip black. Inner side and lower sulcus light green. Abdomen greenish gray, with a row of large black spots on each side, sometimes forming an almost continuous longi-

tudinal stripe. Abdomen sometimes mottled with black above, is greenish yellow below, with a narrow black line on the last segments below the fold. Sternum and anterior legs tinged with blue. Hind tibiae pale red with black spines. In the male the posterior segments of the abdomen are margined anteriorly with black.

Length of ♀ .90 inch ; elytra, .45 inch. Length of ♂ .80 ; elytra .40. Appears in June at Glencoe, Dodge Co., Nebraska.

Pegotettix autumnalis, n. s.

Frontal costa prominent above, suddenly widened and sulcate at the ocellus. Head unusually large, wider than thorax, occiput very long. Foveola of vertex shallow. Median carina of pronotum slight, cut once behind the middle. Sides of pronotum nearly parallel. Elytra short, oval, pointed. Abdomen rather long and slender, extending beyond the tips of hind femora in ♀. Male cerci nearly straight, broad at base, apical half slender and pointed. Tip of abdomen pointed entire.

Color of dried (not alcoholic) specimens—Face brown, white mottled with brown below clypeus. Cheeks yellow and brown. Antennae rufous. A black stripe from eye to last lobe of pronotum. A yellow spot below the black stripe. Remainder of pronotum brown, hind lobe lightest. Occiput brown margined with yellow. Elytra dark brown, unspotted. Abdomen dark above. Anterior legs yellow, marked with red above. Posterior femora yellow at base, then red on both sides and below, but heavily marked on upper side of exterior face with fuscous. Posterior tibiae blue.

Length of ♀ 1.10 inch ; elytra .25 inch. Length of ♂ .85 inch ; elytra .203 inch. Glencoe, Nebraska, in September.

Pezotettix alba, n. s.

Form—Frontal costa sulcate, extending across clypeus in living specimens. Foveola of vertex hexagonal, shallow. Median carina of pronotum distinct, cut by last transverse impression back of the middle. Lateral carinae rounded, nearly parallel. Elytra cross third abdominal segment in ♀. Wings minute. Legs long and slender. Male cerci long and slender. Terminal segment of abdomen entire acuminate. In the male the antennae are longer than head and pronotum, and the posterior femora pass the abdomen one-fourth of their length.

Color of living insect—♂, vertex, disk of pronotum and legs bright green. Face, abdomen and under side greenish white. Elytra a little

darker. A white stripe from top of eye follows the lateral carinæ to the end of pronotum, and extends obliquely down the side to insertion of posterior femora. Below the white stripe, and running parallel with it, is a broad band of green followed by another white stripe.

Color of ♀ vertex, disk of pronotum and legs white, mottled with green. Rest like ♂, but much whiter. Antennæ light brown.

Length of ♀ .85 inch ; elytra .02 inch. Length of ♂ .65 inch.

Taken in August and September at Glencoe, Dodge Co., Nebraska.

Caloptenus lurida, n. s.

Size and form much like *C. occidentalis* Thos. Frontal costa with slight depression at ocellus, not sulcate. Foveola of vertex shallow, elongate, broadest in ♀. Median carina of pronotum slight, transverse impressions distinct. Lateral carinæ slightly divergent. Antennæ longer than head and pronotum. Posterior femora as long as the abdomen. In the male the cerci are broad and flat, considerably curved and armed posteriorly with a rather long and sharp lateral tooth, giving them about the shape of the letter Y. Last ventral segment entire. In color this species, when living, is dark bluish gray. The pronotum and upper part of the head are sometimes lighter and tinged with red. Labrum bright red ; antennæ red at base, rest fuscous. Posterior femora light gray, with a longitudinal black stripe the entire length of the disk, and three black spots on the upper edge ; the two posterior ones uniting with the black stripe and extending over upon the inner face. Tip black above, red below. Posterior tibiae blood red, with black spines.

In some specimens a light stripe on the side from base of elytra to posterior femora is apparent, but it is usually indistinct. Elytra cinereous darkest at base, with a central row of fuscous spots.

Length of ♂ .85 inch ; of ♀, 1.05 inches.

Habitat, Dodge Co., Nebraska. Time of occurrence, September.

Caloptenus regalis, n. s.

♀. Size medium. Frontal costa prominent ; not sulcate, but depressed at the ocellus. Top of the head raised slightly above the pronotum. Antennæ longer than head and thorax. Disk of pronotum gradually ascending toward median carina. Lateral carinæ rounded. Pronotum depressed and cut near the middle by the last transverse incision. Hind border obtuse angled.

Color of living insect—Face bluish white, mottled with brown. Cheeks blue, with an oblique darker patch. Eyes prominent, dark brown, hind margins dotted with black lines. Occiput with a triangular black spot, apex forward, bounded on each side by bright yellow. Sides of the thorax margined anteriorly with yellow. A black stripe behind the eye runs backward to the last transverse incision of pronotum. Below this stripe the sides are purplish blue, marked posteriorly with red. Disk of pronotum brown, margined with blue. Elytra gray, darkest at base. Disk white, containing a row of large black spots. Similar but smaller spots unequally distributed over the rest of the elytra. Apex dusky. Wings transparent, with white veins. Posterior femora externally red, with three oblique black bands. Inside and lower sulcus bright red. Upper edge bluish gray, with three broad black patches. Apex gray above, white outside, blue within, and marked with the usual black crescent-shaped patch. Hind tibiae bright blue, with a narrow white annulation near the knee. Tarsi blue above, white below. Anterior legs yellowish, mottled above with blue. Abdomen white, with the anterior part of each segment red, and a small black spot on each side. Beneath bluish white. Antennae light brown.

Length about one inch; length of elytra, .80 inch; length of hind femora, .55 inch. *Habitat* Glencoe, Nebraska. Appears in latter part of June.

SUGARING FOR MOTHS.

BY O. S. WESTCOTT, MAYWOOD, COOK CO., ILL.

The various preparations which have been recommended by different writers seem to be successful enough in attracting nocturnal Lepidoptera, while the poisons employed for quieting them seem to fail in one or more essential particulars. Cyanide of Potassium, whether alone or prepared with Plaster of Paris, does not act with sufficient readiness to prevent strong-bodied moths from fluttering so long as in a great measure to spoil the beauty of their vestiture, while the application of chloroform at night is attended with considerable inconvenience. I have found a plan like the following to work best in practice.

Have not less than four wide-mouthed bottles, two of them of sufficient size to be placed over any *Catocala* without rubbing him. Have each of these last provided with a large, well-fitting cork, to the bottom of which firmly tack a small piece of sponge. This sponge is to be moderately supplied with chloroform. The other bottles are to be filled for one-fourth of their depth with small fragments of Cyanide of Potassium, thoroughly covered with plaster of Paris in the usual way.

A hunting-coat which is provided with numerous pockets will be found a great convenience, the chloroform bottles occupying the side pockets, and the Cyanide bottles the hip pockets. For the completest success a dark lantern is almost indispensable. This should depend from a strap passed around the waist, so that both hands may be left free for purposes of manipulation. The moths are with no difficulty covered by the chloroform bottle, the effect of the chloroform being almost immediately apparent. Then the moths thus temporarily anaesthetized are transferred to the Cyanide bottles, whose contents complete the work so well begun. The two Cyanide bottles are a great convenience in keeping apart the large and the small specimens, and these being kept constantly in an upright position, the danger of injury from rubbing is reduced nearly to a minimum. The two chloroform bottles are to be used alternately as occasion seems to require.

The collector will soon find that while many of the moths will bear a brilliant light, many others will start as soon as light enough is thrown upon them to make them fairly visible. He must therefore be exceedingly wary of starting these timid ones, even though his present quest be among those which bear the greater amount of light, for oftentimes the fluttering of two or three will start from the tree nearly every individual, and hundreds will be in the air on the shortest notice. I have never succeeded with ale, stale beer or rum, in so intoxicating any species of *Catocala* that it would bear light or noise without indicating dissatisfaction. This leads me to remark that one will invariably meet with the best success when he works alone. Conversation will surely start the moths from any enticements of sugar that can be devised. I have even been much annoyed by a cat which would persistently precede me from tree to tree, and in her anxiety to get food (for she devoured the moths greedily), would thus startle the very ones which I was particularly anxious to capture. On one occasion a chipmunk visited one of my trees and kept it completely cleared of the bait with which I had supplied it, becoming at

length so indifferent to other surroundings that I had little difficulty in giving him a sound rap over the head with a hickory switch, which sent him some ten feet away, and though he scrambled hastily up a neighboring tree, I found him on my next round, a few minutes afterward, demurely licking my sugar again as though nothing had happened.

Notwithstanding the season just closed has been somewhat noticeable for the scarcity of Lepidoptera, a fact doubtless to a great extent due to the severity of the previous winter, the subjoined table will show that the material collectible at sugar is at least reasonably abundant. It will be seen that for the four weeks beginning on Aug. 17th, I was at my post five nights each week. Subsequent to that period other duties prevented my continuing the work regularly. It should be observed also that whereas I made a somewhat exhaustive examination of the trees from Aug. 17th to Sept. 11th inclusive, I after that time made no memorandum of the more common species which still continued to throng for their accustomed food. In connection with a few of the species enumerated no dates are designated, as my memoranda failed to indicate the precise time of their capture. Earlier in the season (June) I had taken at sugar *Thyreus Abbottii*, *Anisopteryx vernata*, *Catocala fratercula*, *C. ilia*, etc., etc., which, except the last named, did not occur after Sept. 17th. Where but a single date of capture appears, usually but a single specimen was taken. Of *Pachypolia atricornis*, however, several fresh specimens were taken Oct. 6th, and one or two on a subsequent date, indicating for this species a very late apparition. Of *Scoliopteryx libatrix*, also, several specimens were taken, and, though not taken, it was observed a night or two previous to Sept. 10th.

Agrotis Normaniana Gr., August 18, 24, 26, 27, 28, 31; September 2, 3,

4, 7, 8, 9, 10, 11.

" *baja* S. V., August 18, 20, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" *badinodis* Gr., September 10, 15.

" *c-nigrum* Linn., August 17, 18, 19, 20, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" *bicarnea* Guen., August 18, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" *herilis* Gr., August 24, 25, 26, 27, 28, 31; September 1.

" *triosa* Lintn., August 24, 25, 26, 27, 28, 31.

" *subgothica* Haw., August 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

- Agrotis tessellata* Harr., August 18, 26, 27, 28, 31 ; September 1, 3, 4.
 “ *clandestina* Harr.
 “ *alternata* Gr., September 23.
 “ *cupida* Gr., September 15.
 “ *saucia* Hübn., August 17, 18, 24, 25, 26, 27, 28, 31 ; September 1, 3, 4, 7, 8, 9, 10, 11.
 “ *velleripennis* Gr., August 28.
 “ *messoria* Harr., August 17, 18, 19, 21, 25, 26, 27, 28, 31 ; September 1, 3, 4, 7, 8, 9, 10, 11, 23.
 “ *suffusa* S. V., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
- Eurois occulta* Hübn., August 27.
 “ *herbida* W. V., August 25.
- Mamestra subjuncta* G. & R., August 17 ; September 10.
 “ *laudabilis* Guen., September 8.
- Dianthoecia meditata* Gr., August 18, 19, 20, 21.
- Pachypolia atricornis* Gr., October 6.
- Hadena arctica* Bois., August 17, 18, 19, 20, 24, 25, 26, 27, 28 ; September 11.
 “ *devastator* Brace., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
 “ *adjuncta* Bois., August 28.
 “ *sputator* Gr., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31 ; September 1, 4, 7, 8, 9, 10, 11.
 “ *modica* Guen., August 24.
 “ *renigera* Steph., August 18, 19, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
- Perigea xanthioides* Guen.
- Dipterygia pinastri* Linn., August 17, 18, 19, 26, 27, 28, 31 ; September 1.
- Hyppa xylinoides* Guen., August 17, 18, 26, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
- Prodenia commelinae* Abb. & Sm., August 17, 19, 25, 28 ; September 1.
- Helotropha reniformis* Gr., August 18, 19, 21, 25 ; September 3, 4, 8, 22.
 “ *atra* Gr., September 10.
- Hydroecia nictitans* Linn., August 17, 26, 27.
 “ *sera* Gr. & R., August 18.
- Gortyna immanis* Guen., August 26 ; September 3, 4, 10, 11, 22, 23.
 “ *rutila* Guen., September 2, 3.
 “ *nebris* Guen., September 15.

Platysenta atriciliata Gr., August 18.

Heliophila pallens Linn., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 4, 7, 8, 9, 10, 11.

" *phragmitidicola* Guen., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" *Harveyi*, Gr.

" *renipuncta* Haw., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" *pseudargyria* Guen.

Laphygma frugiperda Abb. & Sm., September 2.

Pyrophila pyramidoides Guen., August 17, 18, 19, 20, 24, 25.

Taeniocampa oviduca Guen.

Atethmia pampina Guen., September 23.

Orthosia inulta Gr., September 22, 23; October 2.

Xanthia ferruginoides Guen., September 3, 4, 10, 15, 22, 23, 29.

Scoliopteryx libatrix Linn., September 10.

Lithophane cinerea Riley, August 18, 26.

Calocampa nupera Lintn., September 23.

Crambodes talidiformis Guen.

Plusiodonta compressipalpis Guen., September 4.

Telesilla cinereola Guen., August 26, 27; September 1, 2, 3.

Lygranthoecia brevis Gr., September 10.

Pyrrhia exprimens Walk., August 28.

Eustrotia carneola Guen., August 17, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4.

" *nigritula* Guen.

Drasteria erichtea Cram., August 17, 18, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" *erichto* Guen., September 11.

Catocala insolabilis Guen., September 2.

" *unijuga* Walk., September 7, 11, 15.

" *Briseis* Ed., September 11.

" *parta* Guen., September 2, 23; October 2, 3.

" *concumbens* Walk., August 17, 24, 25, 26, 27, 28, 31; September 1, 8, 10, 11, 23.

" *amatrix*, Hübn., August 31; September 1, 7, 11, 22, 23; October 2, 3.

" *cara* Gnen., August 17, 18, 31; September 2, 3, 7, 8, 9, 11, 15, 22, 23, 29; October 2, 3.

- Catocala ilia* Cram., August 19; September 23.
 " *cerogama* Guen., August 31.
 " *neogama* Guen., August 31.
 " *piatrix* Gr.
 " *habilis* Gr., October 23.
 " *consors*, Abb. & Sm., September 7.
Homoptera lunata Drury, August 18, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11, 22, 23.
 " *Saundersii* Beth., September 1, 2, 3, 4, 7, 8, 9, 10.
 " *edusa* Drury, September 1, 2, 3, 4, 7, 8, 9, 10, 11, 22, 23.
Pseudaglossa lubricalis Geyer, August 17, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10.
Epizeuxis americana Guen., September 10.
Zanclognatha cruralis Guen., August 28.
Orthosia helva Gr., August 18, 21, 28; September 3, 4.
Homopyralis tactus Gr., August 28.
Camptogramma gemmata Hübn., September 2, 3.
Phaecariophora niveiguttata Gr.
Ochyria latirupta Walk., October 2.
Eupethecia miserulata Gr., September 23.
Asopia costalis, September 3.
Tortrix coruscana Clem., September 3.
Darapsa choerilus Walk., August 26.

ON CHOEPHORA AND ALLIED GENERA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The discovery of fresh specimens has induced me to modify my proposed fusion of the genera *Choephora* and *Pseudorthosia* (Bull. B. S. N. S., 3, p. 86). For the present I would arrange the species as follows:

♂ Antennæ bipectinate, setose; eyes naked; all the tibiæ spinose; abdomen cylindrical. . . *Choephora* G. & R. (Sp. 2; *C. fungorum* G. & R., *C. pectinata* Grote.)

♂ Antennæ brush-like; eyes naked, lashed; all the tibiæ spinose; abdomen cylindrical; habitus of *Orthosia*. . . Pseudorthosia *Grote* (Sp. 1: *P. variabilis* *Grote*).

Fore tarsi with prominent spines at the extremity of the joints; fore tibiæ not spinose, middle and hind tibiæ spinose; abdomen a little flattened; habitus of *Glaea*. . . Pseudoglaea *n. g.* (Sp. 2: *P. blanda* *Grote*, *P. taedata n. s.*).

Pseudoglaea taedata n. s.

♀. The males are not known of this genus, which differs from the *Ammoconia* group of *Agrotis*, by the want of a mesial thoracic crest, unarmed fore tibiæ and the spines on the fore tarsi. *P. taedata* is of a faded olive fuscous, with a dusting of darker scales; hind wings and under surface tinged with ruddy. Stigmata darker than the wing, blackish; orbicular rounded; reniform upright, squarish. T. p. line black, even, nearly straight, slightly bent; s. t. line irregular. Hind wings with faint mesial line and spot, more visible beneath, where in the primaries the discal mark forms an annulus. *Expanse* 44 m. m. Texas (G. W. Belfrage, No. 584, Nov. 15).

In the specimen the t. a. line is not indicated. The large species would be taken for a *Glaea* at first sight. It is paler, more dusty colored than *P. blanda*, with larger stigmata. There is a faint terminal festooned line on the wings, beyond which the concolorous fringes are paler, a little yellowish, at their base.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

GRACILARIA.

G. negundella. N. sp.

Basal joints of fore legs ochreous red; femora and tibia dark brown, obscurely marked with white; tarsi white dusted and annulate with brown. Intermediate legs like the first pair, except that the basal joints are brown; hind legs and the under surface of the abdomen white dusted with dark brown, the tarsi tinged with yellowish and the upper surface of

the abdomen brownish. Palpi dark brown, with whitish scales intermixed on the under surface; antennae with alternate annulations of white and dark brown; head, thorax and fore wings ochreous, dusted with white and with some small dark brown spots along the costal and dorsal margins (these spots are sometimes indistinct), and the apex sometimes sparsely dusted with dark brown scales; the triangle is *very faintly* indicated, being a little paler than the rest of the wing; ciliae pale grayish fuscous, with the apex and a "hinder marginal" line about the middle dark brown. *Al. ex.* 7 lines. The larvae were found in abundance at Drura, Colorado, in September (alt. 5,300 ft.) rolling downward from the tip of the leaves of the Box Alder (*Negundo*). Though this tree is abundant in Kentucky, I have never met with any larvae of this genus feeding on it.

In the last number of the *Cincinnati Quarterly Journal of Science* (Vol. 2, p. 289) I have published descriptions of other species of *Tineina* from Colorado, but that paper abounds in typographical errors, some of which it is necessary to correct to prevent confusion; and as that journal is no longer published, I avail myself of this opportunity to correct them. Such mistakes as "*Teneina*" instead of *Tineina* are palpable and scarcely need correction, but there are others that do. P. 290, for "*rosasuffusella*" read *roseosuffusella*; for "*Taygate*" read *Taygete*. P. 291, for "*gallaesolidaginis*" read *gallaesolidaginis*. P. 292, for "*cruciferuu*" read *cruciferarum*. P. 294, for "*gædastella*" read *gædartella*, and for "*sparsipulrella*" read *sparsipulvella*. P. 295 and elsewhere, for "*Phylletis*" read *Phyllocnistis*. P. 300, for "*lespedegofoliella*" read *lespedezæfoliella*. P. 301, for "*puinrosella*" read *prunionella*, and p. 304, for "*Thuiva*" read *Theisoa*.

I take this opportunity also to correct a few errors of a similar character which, thanks to the P. D. or bad chirography, have crept into some recent numbers of the CAN. ENT. Ante p. 124, for "*bodicella*" read *badiiella*. The position in which the names *Solenobia Walshella* Clem. and *Tinea auropulvella* Chamb. are placed on p. 125, *might* possibly convey the impression that they are considered as synonyms for the same species, but such was not my intention, as the insects are very distinct and have but little resemblance to each other. *Walshella* is *loc. cit.* only catalogued as found in Canada.

NOTES ON ARCTIA AMERICANA.

BY H. H. LYMAN, MONTREAL, P. Q.

As I have reared the above named moth from the egg, I can add an interesting fact or two to the account of its preparatory stages, published by Mr. Bunker on p. 149, vol. vii, of this periodical.

From a batch of eggs laid about August 6th, I obtained a number of larvæ, eight or ten of which passed through their last moult but one on September 23rd, and one accomplished its last moult on October 5th, after which it rapidly increased in size, attaining its full growth in a day or two, and then spun itself up into a cocoon, which was kept in the house. The imago emerged on November 28th. All the others died during hybernation.

CORRESPONDENCE.

I am able to add the names of two more species of butterflies to Mr. Caulfield's "List of Diurnal Lepidoptera of the Island of Montreal," published on pages 86-90, of vol. vii, namely: *Lycæna violacea* Edw., very rare; I took one ♀ specimen on our mountain, on June 10th, 1874. *Amblyscirtes vialis* Edw., very rare; one example taken on our mountain on June 8th, 1875. I am indebted to Mr. Scudder for the determination of these species. There is one error in Mr. Caulfield's List which requires correction; the name *Euphyes metacomæ* Harris should be substituted for *Hedone orono* Scudder, as the latter does not occur here as far as known.

H. H. LYMAN, Montreal, P. Q.

WEEVIL COCOONS.—W. H. G. writes in *Science Gossip*, No. 133, Jan'y 1, 1876, that he obtained the Weevil (*Cionus scrophularia*) from cocoons made by the larvæ on the Water Betony (*Scrophularia aquatica*).

WM. COUPER, Montreal, P. Q.

VANESSA MILBERTI.—This insect has lately come from its winter retirement in some numbers. The weather has been delightful.

W. L. MEAD, Ithaca, N. Y.

The Canadian Entomologist.

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No. 2

THE NORTH AMERICAN BLUE BUTTERFLIES OF THE GENUS NOMIADES.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Some years ago I proposed* the generic name *Glaucopsyche* for a group of blue butterflies of eastern N. America having a glaucous sheen to the upper surface of their wings; I had not then recognized its strictly generic alliance with a group of similar forms in Europe and on our Pacific slope, which do not all possess this peculiarity, and to which the older generic name *Nomiades* Hübn. must be applied. A recent study of their common structural features, however, shows that *Glaucopsyche* can no longer be retained. Finding that there has been some confusion, at least in the cabinet designations of the species of this group, a brief revision of the same, with comparative descriptions, is here offered.

The species belonging to this group, it may be remarked, all have but a single transverse series of spots upon the under surface of the hind wings (the extra-mesial row), the submarginal markings being wholly obsolete. In the six American species the upper surface of the wings of the male are always blue, more or less broadly and distinctly margined with dark brown, while the wings of the female have this surface dark brown, more or less amply suffused from the base outward with blue.

I. *N. XERCES* (*Lycaena Xerces* Boisd.) In this species the blue on the upper surface of the wings of the male is of a pale tender violet and the margin is neither so black nor so narrow as in the other species, and has a very faint extreme edge of black. The upper surface of the wings of the female is of a little paler brown than in the other species, has a decidedly white, untarnished fringe, and at the base scattered blue scales as in *N. Antiacis*, but extending further from the base; the black outer edge is more distinct than in the female of the other species. Beneath,

* Syst. Rev. Am. Butt., 33.

the species is readily distinguished by its having all the spots large and white, with no black pupils; they are usually roundish subquadrate and those of the same series nearly coalesce to form a continuous band. California.

2. *N. ANTIACIS* (*Lycæna Antiacis* Boisd., *Lycæna Mertila* Edw.) The blue of the upper surface of the wings in the male of this species is much less pruinose than in the following two species, although it occasionally varies toward them in this respect; the normal color, however, is a deep violet and the black border of the wings is of the same depth of color and narrowness of extent as in these species. The upper surface of the female is almost entirely brown with a few scattered blue scales near the base of the wing running out toward the middle. Beneath, the wings closely resemble those of *N. Couperi*, but the sprinkling of hoary scales is nearly uniform over both wings. California.

Lyc. Mertila Edw. seems to me clearly referable to this species, since the only part of the description which does not fit it is the statement that, on the underside of the fore wings, "from the arc" (or transverse bar at the apex of the cell) "a whitish ray runs toward the base."

3. *N. COUPERI* (*Glaucopsyche Couperi* Grote; *Lycæna Pembina* Edw. [Syn., nec. Proc. Phil. Acad.]* *Lycæna Lygdamus* Doubl. [List Brit. Mus. nec Entom.]) This species closely resembles the following, with which it has often been confounded; the two, indeed, would perhaps be universally considered geographical races of a single species, were they known to meet anywhere on common ground. The upper surfaces of the wings of the males of the two species appear to agree altogether. The upper surface of the wings of the female of this species is brown, rather heavily suffused with cerulean blue on the fore wings as far forward as the upper limits of the cell, and to an equal distance toward the outer border; on the hind wings, the blue scales are more generally diffused, but in much less abundance. Beneath, the spots are much smaller than in *N. Lygdamus*, sometimes reduced on the hind wing to the merest black specks encircled with white; and the ground color is obscured, especially on the hind wing, by a rather abundant powdering of grayish hoary scales. A

* A prolonged study of all the species of *N. American* blues leads me to the conclusion that the true *Lyc. Pembina* Edw. has been twice redescribed; under the names *L. Lyceæ* Edw. and *L. Rapahoe* Reak.

northern Atlantic species, not yet found in the United States, but extending from Anticosti and Southern Labrador to Lake Winnipeg and the Saskatchewan.

4. *N. LYGDAMUS* (*Polyommatus Lygdamus* Doubl. Entom.) I have never seen the female of this species, but the wings of the male are pale glistening pruinose blue above, with a narrow, distinct, black border; beneath, the species is peculiar for the large size of the ocellated spots, the clearness of the dark slate brown ground color little obscured by any dusting. It is a Southern Atlantic species, ranging through the sea-board States of the Union from the valley of the upper Susquehanna to Georgia.

5. *N. ORO*, nov. sp. This species has been referred in collections to the preceding species, with which it is no doubt closely allied, but from which it differs in several particulars. The upper surface of the wings of the male is almost entirely destitute of the pruinose bloom of *N. Lygdamus* and is of a much more delicate, tenderer blue, which permits all the spots of the under surface to be seen upon the upper side, a peculiarity shared with it by the following species only; the dark border of the wings is also narrower than in *N. Lygdamus*, but equally well defined though not so dark; the grayish white fringe of the hind wings is not in the least interrupted by blackish at the nervure tips, as it always is in *N. Lygdamus*. The upper surface of the wings of the female is mostly of the same blue as in the male, through which the spots of the under surface of at least the hind wings may be seen; the apical fifth or sixth of the fore wings is brown, generally merging gradually into the blue and never sharply defined from it; so the anterior portion of the hind wings is of the same brown as far as the subcostal nervure and its middle band, and a narrow line of brown follows the hind border; the apex of the cell is marked by a very narrow, sub-obsolete, transverse blackish bar. Beneath, the wings closely resemble those of the Californian *N. Antiacis*, but the extra mesial series of spots on the hind wings is more uniform, the distance between the second and third spots (from the costal border) being less than usual in this genus. I have only seen this species from Colorado.

6. *N. BEHRII* (*Lycæna Behrii* Edw.; *Lycæna Polyphemus* Boisd.) The upper surface of the wings of the male is of a blue, scarcely differing from that of *N. Oro*, but is not quite so delicate and is slightly darker, with all the veins slightly hoary and so more than usually distinct;

the base of the costal border is also distinctly marked with whitish scales ; the dark bordering of the wings is narrower than in any of the other American species of *Nomiades*, narrowing on the fore wings from in front backward so as to be a mere line below the middle of the wing, and being but a mere line throughout the entire outer border of the hind wing ; the tips of the nervules are narrowly blackish : the fringe is blackish at base, whitish beyond, most narrowly interrupted with blackish at the tips of the nervules of the hind wings. The upper surface of the wings of the female, an inspection of which I owe to the kindness of Mr. Mead, resembles that of *N. Couperi*, but the hind wings are more suffused with blue. Beneath, the ground color of the wing is paler than in our other species, being of a delicate pale French gray, slightly darker in the female than in the male ; and it differs from the other species also in the contrast between the size of the spots on the fore and hind wings, though a similar but not so striking a disparity may sometimes be seen in *N. Couperi* ; on the fore wing these spots, with their rather narrow white borders, occupy each an interspace's width, though the transverse bar at the tip of the cell is reduced nearly to a line ; on the hind wings the bar at the tip of the cell would scarcely be noticed but for its white bordering, and the spots are of uniform size, the black pupils reduced to little more than dots with a pale bordering as broad as that of the spots on the fore wings. The only specimens I have seen come from the southern part of California ; probably the species does not occur in the middle and northern parts of the State.

It appears highly probable that the species here described is the true *Lyc. Behrii* Edw., though not the species (*L. Maricopa* Reak. *) labelled *L. Behrii* in collections, from the later determinations of Mr. Edwards. It may also be considered the *Lyc. Polyphemus* of Boisduval, a name which Mr. Edwards has placed as synonymous with the *L. Behrii* of his later determinations, *i. e.*, *L. Maricopa*. In the specimens above described, however, the two upper spots of the extra mesial series of ocelli on the hind wing (to which it would seem that Boisduval referred) are not coalesced, devoid of ocelli, and their separation indicated by a dusky nervule. Boisduval's expression is "on voit à la place des deux petits points discoidaux, une tache blanche cordiforme coupée transversalement par une petite ligne noire à peine sensible." He also speaks of the female as brown, without reference to the basal suffusion of the wings with blue.

* This species has sub-marginal markings on the wings.

DESCRIPTIONS AND NOTES ON CERTAIN MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Among several interesting species of Noctuæ, which recent collections in the vicinity of Buffalo, N. Y., have brought to light, is a species of *Gortyna* Hübn. (*Hydroecia* L.ed.) allied to *G. nitela* Guen. I have already called attention to the fact that the single European species of *Ochria* Hübn., to which Lederer would restrict the term *Gortyna* (as I believe incorrectly), is distinguished by a clypeal projection, easily perceived if a slender pin is passed along the front, without denuding the head of the insect. The Californian *Ochria Sausalita* is also furnished with a clypeal horn; but the Eastern species are without it, and are all referable to the genus *Gortyna*. Many of the species of this genus are infrequently met with, as a rule; and, even in Europe, seem to be among the rarities. This is perhaps owing to their habits; the larvæ being internal feeders in the stems (*Gortyna* in part) or roots (*Apamea* Ochs. *Hydroecia* Guen.) of plants. Mr. Norman has bred *Gortyna cataphracta* Grote from thistle stems. This latter species has a curious resemblance to the European *Ochria flavago*, but differs generically by the want of the clypeal horn.

Gortyna necopina, n. s.

♂ ♀. Of the same blackish olivaceous with *G. nitela* and *Stibadium spumosum* Grote, with paler hind wings. Everywhere there is an even sprinkling of white scales. These can be seen on the body parts and secondaries, as well as most prominently on the dark anterior wings. No markings on these latter whatever. All lines and spots obsolete. Only the reniform indicated by a deeper color. The costal white ante-apical dots are obsolete or extremely minute. Beneath both wings pale, like hind wings above, everywhere pulverulent with white. The legs and under body parts are everywhere powdered with white. This character is here not very conspicuous and becomes unnoticeable when the insect is rubbed, as is the case with my male example. It may be made out, however. The median space of primaries is more sparsely frosted. *Expansion*, ♀, 43 mil.; *length of body*, 24 mil. *Expansion*, ♂, 34 mil.; *length of body*, 17 mil. Collected by Mr. Fischer.

Differs from *nitela* by its less purely olivaceous color, the absence of the t. p. line and inconspicuous costal dots. The thoracic tuft behind the collar is prominent.

Lygranthoecia Meskeana Grote.

I learn that this species has been re-described under the name *Heliothis fastidiosa* Strecker.

Xylomiges hiemalis Grote.

I learn that this is the "*Dryobota Californica* Behr. MS.," too briefly described in Mr. Strecker's work for identification, and later than the above name in appearing. The eyes are hairy, not naked, as they should be were the insect a *Dryobota*.

Galgula subpartita Guen.

This species I have collected not uncommonly in Central Alabama. Mr. Belfrage has sent it from Texas, and Mr. Lintner from New York. It has also been sent from California by Mr. Hy. Edwards and Mr. James Behrens. From Illinois Mr. Thos. F. Bean has forwarded me a specimen authentically determined as "*Telesilla vesca* Morrison." This latter name is a synonym; the species of *Galgula* being also generically distinguishable from *Telesilla*.

Hadena quaesita, n. s.

This is closely allied to *lignicolor*, but a darker colored species. The ornamentation is similar, the stigmata more distinct, the reniform smaller. The median lines are faint, and seem to occupy similar positions with those in *lignicolor*, but here the t. p. line is more flexuous, being a little bent between veins 2 and 3. The hind wings are blackish fuscous, paler at base, with faint median line, reflected discal spot and light yellowish fringes. Beneath darker than in *lignicolor*. In the new species the color is more blackish brown; over the terminal space the color is, as usual, deeper, relieving strongly the pale W-mark. On a close comparison, the t. a. line is seen to be less strongly produced on submedian fold than in *lignicolor*; the reniform is narrower superiorly, smaller, and less constricted. Else the species might be considered at first sight as a very dark *lignicolor*, with the markings distinctly apparent. The orbicular is pale and reduced. *Expanse* 45 mil. Racine, Wisc., Mr. O. Meske,

Stiria rugifrons Grote.

This species is found to have been unintentionally omitted from the "Check List."

Tarache patruelis Grote. (743 of "Check List.")

A small species taken by myself in Alabama, and sent from Bastrop Co., Texas, by Mr. Meske. Referred here provisionally. Scaly. Fore wings triangulate, shaded ochreous and pale. The ordinary lines very pale and narrow. The most prominent ornamentation an oblique stripe (median shade?) running inwardly from costal angulation of t. p. line to middle of hind margin, and joining an apical streak so that it appears to issue from apex. The stripe is whitish, bordered inwardly with deep ochreous. Outside of it the narrow t. p. line runs divergingly to internal margin. Hind wings pale yellowish white, stained along external margin. The Texan specimen is smaller, more yellowish and paler than my type from Demopolis, which expands 16 mil.

The second part of my Check List of Noctuidæ is delayed by my not having as yet sufficient material in the Deltoids, and I venture to call the attention of my correspondents generally to this fact and to urge the collection of this group the present season. I shall be glad to receive collections of Deltoids from any quarter and will determine and return specimens promptly.

Hyphenula, n. g.

The moth possesses characters which ally it to *Renia* and *Hyphen*. The ♂ antennæ are setose and provided with two longer bristles on each joint. The ♀ antennæ are similar, but the bristles are shorter. The palpi are free, very long, curved, with elongate second joint, and extend upwardly above the head; they are flattened, rather shortly scaled and seem to be slightly longer in the male. Eyes naked, tibiæ unarmed, vestiture of allied genera. The wings are more elongate than in *Hyphen*, much like *Renia*, with full rounded secondaries not exceeded by the abdomen.

Hyphenula opacalis, n. s.

♂ ♀. Entirely dusky blackish fuscous. Median lines fine, black, denticulate, single. T. a. line outwardly curved. Reniform with two superposed white dots (sometimes obsolete), small, yellowish or dis-

colorous. Orbicular small, discoloured, near the t. a. line. Subterminal line pale, denticulate, continued on hind wings. Terminal sub-continuous black line similar on both wings; fringes dusky. Hind wings blackish fuscous, but little paler than primaries, with a median black shade line. Beneath paler with double rivulose lines, the outer pale shaded; a discal streak on hind wings. *Expanse* 22 to 30 mil. Texas, in May (Belfrage, Nos. 185, 195, 196). Varies in distinctness of the pale shading to the subterminal lines, and by the t. a. line being in one specimen edged inwardly with whitish scales. There appears to be in fresh specimens a very sparse frosting of white scales over the fore wings.

Melanomma auricinctaria Grote.

I have received from Mr. E. L. Graef the second specimen I have yet seen of this little moth. I find that it has ocelli. Notwithstanding its rounded wings, pectinate antennæ, and gray, geometridous ornamentation, it must be referred to the Pyralidæ. It is possibly allied to the Brazilian genus *Cryptocosma* of Lederer; the shape of the wings is, however, quite different. The species can be easily recognized by the black cellular spot, which beneath shows a yellow iris, and by the subterminal line of gilded scales. The tapering smooth abdomen and elongate palpi assist us in referring the moth to the Pyralidæ, while the neuration has not been examined. It appears to be of rare occurrence in New York and Pennsylvania.

Euproserpinus phacton G. & R.

Dr. Boisduval (Suites a Buffon, 1874, 363) says as to the species which he calls *Macroglossa phacton*, quoting Grote and Robinson's original description, that he does not know by what chance we changed the name of this species from *crato* to *phacton*. This remark is based on a misunderstanding. We first described this species as *Euproserpinus phacton* in our Synonymical Catalogue, Nov., 1865. It had not been previously described. A colored drawing was shown us by Mr. S. Calverley (who had had it engraved with the name), with the information that the insect had received the name of *Proserpinus phacton* Boisduval in manuscript. We preserved Dr. Boisduval's name, giving him in our paper credit for the species. Afterwards, in 1867, we had a specimen kindly loaned to us by Dr. Boisduval, *two years later*. On this specimen we gave a re-description of the species (under the same name) in September, 1868, Trans. Am. Ent. Soc., giving our views on the structure of

the genus. At about the same time Dr. Boisduval published the species under the name *erato*. This was the first known to us of any other name for the insect. In his last work Dr. Boisduval disavows the authorship of *phaeton*, but adopts the name for the species on our authority. I come to the conclusion that the name "*phaeton*" was transferred from some other species by Dr. Boisduval's Californian correspondent, or that the name "*phaeton*" was originally proposed by some other naturalist, perhaps Dr. Behr or Lorquin.

Oncocnemis Saundersiana, n. s.

Fore tibiae with a terminal claw. Allied to *Oncocnemis occata* from Texas and California. Differing as follows: Head and thorax black. Median space darker than basal and terminal spaces, which latter are washed with white. Median lines twice further apart inferiorly than in *occata*. Median lines *even*, not scalloped. Median shade black, not very diffuse. Ordinary spots larger; orbicular with an evident dark centre. The dentations of the s. t. line connected, followed by a vivid white line. Fringes wholly black, not checkered as in *occata*. Hind wings much as in *occata*; a terminal vague broad blackish band, within which is seen the median line; fringes white. Beneath less brown than in *occata*. *Expanse* 28 mil. Grimsby (Mr. Pettit). Two specimens.

This is a very handsome, distinctly marked species, easily recognized by the above contrast with its ally. Named for Mr. Wm. Saunders, of London, Ont.

Hadena illata.

Agrotis insignata || Walk., C. B. M., 353.

Agrotis illata Walk. *ibid*, 742.

From a specimen in the D'Urban Collection, in the cabinet of the Ent. Society of Ontario, determined as "*Agrotis illata*" by Mr. Walker. I find that the insect is a common *Hadena* which I had not hitherto identified with certainty. Whether this name can be sustained for the species I am doubtful, Mr. Walker's description being vague and even contradictory, except as to color.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

POLYHYMNO.

Instead of "extreme tip hooked backwards," as in the generic diagnosis, it would be better to say extreme tip curved outwards.

P. fuscostrigella. *N. sp.*

On page 247 of volume six, I have described a species as *P. luteostrigella*, which is scarcely an appropriate name, as the streaks are golden rather than luteous. The markings in this species are identical with those of *luteostrigella*, except that the streaks are fuscous instead of golden, though each of them becomes yellow before the apex. In the description of *luteostrigella* it is stated that the streak within the dorsal margin and the inferior branch of the median meet in the apical part of the wing, and then immediately separate and meet again at the apex; perhaps it would be more accurate to say that they cross each other instead of meet and separate, and in some specimens they simply meet and pass around the dorsal margin to the apex together (being margined along the base of the ciliae with yellow); in such cases the space between the two branches of the median streak is streaked with fuscous, which seems to be a continuation of the intro-dorsal streak which has become confluent with or interrupted by the dorsal branch of the median. In both species the third and fourth costal streaks are very oblique, the third pointing backwards and the fourth forwards and converging to the same point, and behind the fourth are two short oblique dark brown streaks pointing backwards to the extreme apex. The account of these streaks in the description of *luteostrigella* is slightly inaccurate and represents one more streak than actually exists. The above account is correct for both species. All of the streaks are confluent before the apex, and all become yellow at or before their confluence, and the caudate tip is yellow, becoming brown at the apex; beneath the caudate tip and opposite to the fourth costal streak is a black dot (not mentioned in the description of *luteostrigella*), and there are in this species two other minute and indistinct ones before it in the base of the ciliae, which at this part

(beneath the caudate tip) have a metallic lustre. *Al. ex.* $\frac{1}{2}$ inch. This species is so similar in the position of its markings to *luteostrigella*, that it may prove to be the same species, but its greater size and fuscous instead of golden markings induce me to consider them as distinct. Texas ; Belfrage.

GRACILARIA.

G. rhoifoliella. *N. sp.*

Face and palpi white, with the apex of each joint of both pairs of the palpi, and some scattered scales along the under surface brown. Anterior and middle tarsi white, with the joints faintly tipped with brown ; tibiae of the hinder pair whitish beneath, and with white spurs tipped with brown ; tarsi white. Thorax and primaries brown with a yellowish tinge, but becoming darker brown towards the apex and on the costa near the base, and with bright purplish reflections in some lights ; along the extreme costa and sometimes on the fold is a series of dark brown dots ; trigonal mark absent ; ciliae fuscous ; venter white, dusted with dark brown. *Al. ex.* $\frac{1}{2}$ inch.

My first specimens came to the light at the Bee Spring Camp of the Kentucky Geological Survey, near Mammoth Cave, but a few weeks later I bred it in Northern Kentucky from larvae mining the leaves both of the "Poison Oak" (*Rhus toxicodendron*) and the Sumach (*Rhus copalina*.) It mines either side of the leaf, and the mine, at first linear, is at some part of it widened and excavated like the tentiform mine of some species of *Lithocolletis* ; sometimes the tentiform mine is not connected with the linear mine. After it has ceased feeding in the mine, it rolls the leaf rather clumsily downward from the tip.

G. inornatella. *N. sp.*

Palpi white stained with ochreous yellow towards the tip of the second joint, and with an ochreous yellow annulus before the tip of the third ; head and antennae white, the antennae annulate with pale yellowish ochreous. Thorax and fore wings white, suffused with pale reddish ochreous, the basal part beneath the fold more whitish ; and there is an oblique white fascia before the middle nearest the base on the costal margin. In some lights the wings show a purple gloss. The hind legs are missing in the single specimen before me ; the anterior and middle pair are of the general hue on their anterior surfaces and white behind,

and the tarsi are whitish, with pale reddish ochreous annulations at the joints. Perhaps the general hue is more accurately designated pale yellowish or brick red, than reddish or yellowish ochreous, and this hue is as, or more, distinct on the under than on the upper surface of the fore wings. *Al. ex.* a little more than $\frac{1}{2}$ inch. Kentucky in May.

G. Sauzalitwella. N. sp.

Face pale sordid yellowish; vertex whitish mixed with reddish ochreous or rust red; antennae fuscous, in some lights tinged with red and faintly annulate with whitish; palpi, fore wings and thorax rust red, or perhaps as properly reddish brown, appearing in some lights deep reddish orange; the palpi a little sprinkled with white, and the dorsal margin of the fore wings from the base to the ciliae darker, almost fuscous; extreme costa white, with a row of minute brown dots along its entire length and extending around the apex, and a similar line of dots marks the more reddish anterior part of the wing from the darker dorsal portion, and the wing becomes darker towards the apex. The general color resembles that of *G. stigmatella* Fab. and *purpuriella* Chamb., but is darker, more lustreless, and there is no trigonal mark. The under surface of the thorax and the anterior surface of the legs are of the general hue, the tarsi being a little paler and annulate with white. Under surface of the abdomen sordid whitish dusted with brownish red. *Al. ex.* nearly seven lines. The neuration is that of *stigmatella* as figured *Ins. Brit.*, v. 3. Sauzalito, California; from Mr. James Behrens.

G. Behrensella. N. sp.

Orange yellow; the palpi a little brownish; the vertex a little pale and the antennae sordid yellowish white with fuscous annulations. There is a small spot on each side of the thorax before the tip, and on the fore wings there is an oblique white streak near the base from the dorsal margin to the fold; behind this is a rather narrow oblique fascia, nearest the base on the dorsal margin, and thence to the tip the wing is much mottled with small white spots, especially along the costal margin, and the yellow color becomes paler towards the tip. Under the lens the white spots appear to anastomose, forming a series of more or less interrupted white streaks, nine or ten in number, perpendicular to the margin and some of them crossing the wing. The apical part of the wing is sparingly dusted with brownish scales, as also are the ciliae, which are pale orange or stramineous. *Al. ex.* $\frac{1}{2}$ inch. California; from Mr. Behrens.

G. basquella. N. sp.

Very near *G. (Parcetopa) robiniella* Clem., but still quite distinct. Head and thorax white with an indistinct narrow brown line from the anterior margin of the thorax to the apex; palpi pale grayish or grayish white; antennae brown; legs brown, the tarsi annulate with white; abdomen brown; anal tuft whitish. Fore wings brown, the apical half dusted with white, the dusting becoming more dense towards the apex; there are three costal white streaks, the first near or a little behind the basal fourth; the second is a little larger, and just beyond the middle both of these are oblique and the second is a little curved; the third before the ciliae is smaller and perpendicular to the margin. There is a basal streak just within the dorsal margin, and which extends to the basal fourth of the wing length; a little beyond this and opposite the point of the first costal streak is a rather large obliquely curved white dorsal streak; the second dorsal streak is opposite the end of the second costal and the third dorsal is small, perpendicular to the margin and opposite to the third costal, *from which it is separated by a straight brown fascia*, which appears very distinct in the dusted portion of the wing. Ciliae white with a wide dark brown hinder marginal line extending around their base and another beyond the middle, and a short brown "hook" at their apex. *Al. ex.* $\frac{3}{8}$ inch. Collected by Mr. Belfrage in Bosque Co., Texas.

G. sassafrasella. N. sp.

Ochreous yellow; the head and long slender palpi inclining to brownish; the outer surface of the third joint brown except at base and tip, and the fore wings with a purplish gloss; antennae longer than the wings, brownish, faintly annulate with pale ochreous. Fore wings with small black dots chiefly along the margins; three of these are conspicuous, one not far from the base, one near the middle and one near the apex on the costal margin, and opposite the space between the first and second is another on the dorsal margin, and the extreme apex is suffused or dusted with brown. Two (or three?) dark brown hinder marginal lines in the ciliae. The wings are very narrow. Hind wings and upper surface of the abdomen dark slate color. The dorsal portion of the fore wings shows the purple hue much more strongly than the costal. First and second pair of legs brown with white tarsi, which are faintly annulate with purple at the joints; third pair of legs a little paler, with ochreous tarsi and base of femora white. Under surface of abdomen and anal tuft ochreous. *Al. ex.* not quite $\frac{1}{2}$ inch.

For many years I have searched the leaves of the *Sassafras officinale* for "Micro" larvæ, but have never found a trace of one until this summer (June, 1875), when the larva of this species made its appearance in great numbers. It is an ordinary white *Gracilaria* larva, which makes a linear crooked mine, ending in an oblong tentiform mine along the mid-rib on the under side of the leaf. When about half grown, the larva leaves the mine and rolls the leaves (chiefly the very young ones) downwards into a clumsy imitation of a cone. It pupates in a yellow cocoon on a leaf.

LYONETIA.

L. gracilella. *N. sp.*

Snowy white with a silvery tinge. Antennæ dark brown above, becoming deeper towards the apex, and paler below; palpi white, *stained externally with fuscous*; fore legs with the anterior surface of the tibiae and tarsi fuscous, and the joints of the tarsi of the middle and hind legs annulate with fuscous; upper surface of the abdomen *pale* silvery fuscous. Hind wings and under surface of the fore wings brown, with short yellowish white lines along the course of the fold on the under surface of the fore wings; ciliae of the hind wings and dorsal ciliae of the fore wings *nearly to the tip brown, with strong purple reflections*; behind the middle of the wing length, along the middle of the wing, is a short brown streak, in some lights golden brown, which presents an obtuse angle towards the costa, and the point of which intersects in the middle a brown or golden brown streak or narrow fascia, which crosses the wing at the beginning of the ciliae, is a little concave towards the base, *and is extended along the extreme costa to the base of the wing, and on the dorsal margin encloses a small white spot*; behind this fascia *is an orange yellow patch which extends to the rather large* circular velvety black apical spot; behind the fascia are three short blackish costal streaks in the ciliae, perpendicular to the costal margin, and equally distant from each other; *opposite the last of these, and separated from it by the point of the orange patch, is a rather long and narrow dorsal* black streak also perpendicular to the margin, and between this streak and the fascia *is a short broad fuscous hinder marginal line at the base of the dorsal ciliae*. Costal and apical ciliae silvery white, and *behind the apical spot is a transverse fuscous line across the middle of the ciliae, which sends back through the tip a short and rather indistinct fuscous "hook."* Al. ex. a little over $\frac{1}{2}$ inch. Kentucky in June.

It is quite distinct from *apici-strigella* Cham., and seems to be between *clerkella* and *padifoliella* as described in *Ins. Brit.*, v. 3. The italics show the points in which it seems to differ from *clerkella*, which is nearer to it perhaps than *padifoliella*.

NEW CALIFORNIAN AND TEXAN MOTHS.

BY LEON F. HARVEY, A. M., M. D., BUFFALO, N. Y.

Arsilonche album, n. s.

An easily described species. It differs from *A. absidum* Harvey, which is received in several examples under the number 2734, from Oregon, by being totally white. Expanse 34 m. m. No. 5993, Oregon, Mr. Hy. Edwards' coll.

The synonymy of the several species of this genus is as follows :

1. *Arsilonche albovenosa* Goeze Btr., 3-3 251 (1781.)

Simyra venosa Bkh. iv, p. 716. 1792.

Leucania Henrici Grote, Bul. Buf. Soc. N. S., vol. 1, p. 10 (1873).

Leucania evanida Grote, Bul. Buf. Soc. N. S., vol. 1, p. 10 (1873).

Ablepharon Henrici Grote, Bul. Buf. Soc. N. S., vol. 1, p. 112 (1874).

Ablepharon evanida Grote, Bul. Buf. Soc. N. S., vol. 1, p. 112 (1874).

Ablepharon fumosum Morr., Bul. Buf. Soc. N. S., vol. 1, p. 275 (1874).

This synonymy is given by Mr. Morrison after Dr. Staudinger has identified the American *Henrici* as the same with the European *albovenosa*.

2. *Arsilonche absidum* Harvey.

Ablepharon absidum Harvey, Bul. Buf. Soc. N. S., vol. 2, p. 275 (1875).

This species is lemon yellow, with the t. p. line continued on the secondaries, variably indicated by dark dots. It is very distinct.

Arsilonche album Harvey.

Faspidea viridata n. s.

Fore wings light green, with distinct black lines. Orbicular with a black annulus and central spot. Beneath this is the large claviform, black

margined and with a black dot; these two form a combination like the figure of eight. Cell black powdered between the spots. Reniform large, with green centre, edged with white and with a black annulus, irregular, medially strangulated. Above it the t. p. line seems to join its outer margin, but in reality is obsoletely produced beyond it, appearing below it dentate to internal margin. Terminal space light green; s. t. line obsolete opposite the cell, below black, dentate. Fringes checkered with black. Hind wings white, with lunule distinct beneath and double exterior shade lines and distinct black edging. Thorax scaly; green with black spots on tegulae.

Expanse 30 m. m. No. 5605, San Diego, Cal., Mr. Edwards.

Agrotis equalis n. s.

♀. Allied to *Wilseni* and especially resembling some of the varieties of that species, but distinguishable by the subterminal line not being twice more prominently indented, but pale, dentate throughout its length, and by the concolorous terminal space and larger stigmata. Hoary olivaceous fuscous with a tinge of brown; claviform indicated; orbicular large, irregularly elongate; reniform wide; the cell shaded with brown; t. p. line geminate, regularly lunulate. Fringes brown, discolorous. Hind wings fuscous, deepening in tint outwardly, with pale, faintly interlined fringes and long narrow discal streak; beneath whitish, irrorate on costal region, with faint terminal shade and discal mark; primaries fuscous. Thorax and head concolorous with fore wings.

Expanse 38 m. m. California. No. 101, Mr. Hy. Edwards' Coll.

Agrotis satis, n. s.

♀. A small species resembling *equalis* in coloration; fore wings more deeply tinged with red brown. A sub-basal brown streak; median lines geminate, denticulate; t. a. line perpendicular; t. p. line rounded opposite cell and there denticulate. Some black dots before the s. t. line; terminally the wing shows a deeper shade; the paler fringes broadly interlined. Hind wings fuscous, without marks, with pale interlined fringes. Beneath fuscous with common line determinate on veins and discal dots; that on primaries contiguous to the line. Collar with a marginal brown line; head and thorax concolorous with wings.

Expanse 28 m. m. No. 3486, California, Mr. Hy. Edwards' Coll.

Agrotis choris, n. s.

♂. Hind wings pellucid white, a little stained; veins marked. Fore wings uniform dull gray; veins obsoletely marked. T. a. line geminate, denticulate, fine, black. Orbicular black ringed, small, rather elongate. Reniform narrow, curved; claviform obsoletely indicated. T. p. line obsolete, marked on the veins. S. t. line faint, near the margin; terminal line black, interrupted; fringes concolorous. Antennae brush-like; head and thorax like fore wings; palpi darker at the sides.

Expanse 36 m. m. Nevada, No. 2626, Coll. Mr. Hy. Edwards.

Agrotis Sierrae, n. s.

♀. Allied to *haruspica*; differs by the paler secondaries and more slender habit. Body and fore wings uniformly fuscous; lines black illegible. Both stigmata present; orbicular rounded; reniform elongate lunate. Hind wings beneath with discal mark and shade line; above immaculate, pale, pellucid, fuscous. Abdomen as dark as thorax.

Expanse 45 m. m. No. 2623, Sierra Nevada, Cal.; Mr. Hy. Edwards Coll. I regret that I have not been able to compare this form with the European *augur*.

Agrotis reclusa, n. s.

♀. The smallest species of the group of *4-dentata* and *cicatricosa*. Hind wings white, soiled with fuscous. Fore wings nearly black, with a yellowish stripe from the base outwardly below costa to above the prominent yellow stigmata. Orbicular spherical; reniform of the usual shape, rather broad, approximate to the dotted t. p. line. A splash of yellowish below median vein to the s. t. line, which is black dotted, followed by yellow with two yellow teeth to veins 3 and 4. Beneath whitish with the spots reflected on primaries.

Two specimens. Oregon, No. 5969, Mr. Hy. Edwards' Coll.

Agrotis pyrophiloides, n. s.

A species with slender body and wide wings, and looking like a *Pyrophila*, but with spinose hind tibiae. Greasy; fuscous and dirty ochre, with wavy blackish lines. Orbicular of the ochreous ground color, concolorous, rounded; median shade blackish, heavy; reniform concolorous; t. p. line geminate, with pale included space, denticulate. Costal dots distinct on the blackish subterminal space. A terminal festooned ochreous line, cutting the black line at base of fringes. In one

specimen the ornamentation is obliterate. Body concolorous; hind wings fuscous, paler at base. Beneath paler with common line and discal marks, that on primaries elongate and near the line.

Expanse 38 m. m. No. 5662, California; No. 5624 var., Mr. Hy. Edwards' Coll.

(To be Continued.)

ADDENDA TO LISTS OF DIURNAL LEPIDOPTERA,
SPHINGIDÆ AND ZYGAENIDÆ OCCURRING
ON THE ISLAND OF MONTREAL, P. Q.

BY F. B. CAULFIELD, MONTREAL, P. Q.

RHOPALOCERA.

Colias philodice Godart, var. *laurentina* Scudd.

In the end of July, 1874, I took a *Colias* on Montreal Mountain, which appeared to me to be different to anything I had hitherto seen. I sent it a short time since to Mr. Scudder, who kindly determined it for me as a Gynandromorphic ♀ of his var. *laurentina* of *philodice*. A second example, also a ♀, was taken by Mr. Pearson the same season.

Thecla agustus Kirby.

One specimen taken by Mr. Kollmar, May 24th, 1875.

Lycæna neglecta Edw.

I took a ♂ of this species June 26th, 1875. It was in beautiful condition, evidently fresh from chrysalis, and is the only example I have seen from this locality.

Euphyes metacometa Harris.

The *Hedone orono* of my List, CAN. ENT., vol. vii, p. 89, must be referred to this species. I received both these species from Mr. Herman Strecker, of Reading, Pa., along with some other material, accompanied by a list giving the names. Unfortunately, when referring the examples to the list I mistook the numbers, and gave *orono* instead of *metacometa*

I have, however, taken *orono* here, as Mr. Strecker wrote me that there was a specimen of it in a box of Lepidoptera that I sent to him in 1872. It is very rare, as I have not met with it since.

HETEROCERA.

SPHINGIDÆ.

Lethia gordius Cram.

One example ; Mr. Pearson.

ZYGAENIDÆ.

Alypia Macullochii Kirby.

Two examples ; Mr. Knetzing.

CORRESPONDENCE.

DEAR SIR,—

In the October No. I find an account of Mr. Dimmock's method of denuding the wings of Lepidoptera. From the account given, it seems to me that it will take as much time, though perhaps less trouble, than the old way of denuding them with a moistened brush. It may, however, answer for butterflies and the larger moths, but for Tineidæ, Tortricidæ, Pyralidæ, and the smaller moths generally, the plan of which I have given an account in a previous volume of this magazine seems to me preferable. It is as follows : Take a piece of glass about one inch by three in size (say a glass "slide" of a microscope), place the wing on it, in from one to three or four drops of strong solution of potash, according to the size of the wing ; cover with one of the thin pieces of covering glass of microscopists (do not use enough fluid to float the cover glass) ; hold, with a clothes pin or other small forceps, the large glass over a lamp chimney until it begins to boil, removing it at the first sign of ebullition, when the wing will be found denuded if it is a fresh and small specimen ; if large, or old and dry, a little longer boiling may be necessary. The fluid may then be drained off by tilting the glass a little, and all traces of the potash removed by adding a few drops of water ; and the cover glass being removed, the wing may be mounted on the same glass or floated on to another, or it may be at once accurately sketched by the microscope and

camera lucida. The whole process of mounting may be accomplished in a minute or little more, or it may be mounted and sketched in five minutes or less. In this way I have mounted and sketched hundreds of wings of Tineidæ, which I hope some day to publish in the pages of the CAN. ENT.

V. T. CHAMBERS.

Colorado Springs, Colorado, Feb., 1876.

ENTOMOLOGICAL NOTES.

DEAR SIR,—

Ceratonia quadricornis.—I have during the past season, and for the first time in my life, taken a number of the larvæ of *Ceratonia quadricornis* Harr., of a brown color. Out of five taken in one locality, four were of a deep brown. The fifth was of the usual green hue. These larvæ were about half grown when captured. This was early in September, but since then I have taken several other specimens, the majority of which were brown. I should like to learn whether any of your readers have, at any time, made similar captures.

Doryphora 10-lineata.—A safe and effective method of destroying this beetle is to drag an ordinary butterfly net over the haulm when the larvæ and beetles are feeding. By this method, and without making any particular effort, I captured on Long Island, this year, over five hundred specimens in about as many minutes. By making a sort of drag net, large enough to be worked by two boys, a much larger number could of course be captured in a given time. I have no doubt that Long Island will be plentifully supplied with *10-lineata* next year; for, although thousands were drowned and washed up on the beach at Coney Island and elsewhere, the number that escaped must have been great. But, although admitting the desirability of ridding ourselves of this pest, I by no means admit that it is the scourge talked about by some Entomologists. As I intimated before, we had plenty of them on this Island, but no one complains of a small crop of potatoes in consequence.

W. V. ANDREWS.

36 Boerum Place, Brooklyn.

ERRATA.—On page 16, line 7 from top, for *Heliophila renipuncta* read *H. unipuncta*.

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No. 3

NOTES ON ENTOMOLOGICAL NOMENCLATURE.

Part I.

BY W. H. EDWARDS, COALBURGH, W. VA.

My attention having recently been drawn to the "Historical Sketch of the Generic Names Proposed for Butterflies, a Contribution to Systematic Nomenclature, by S. H. Scudder, Salem, 1875," in which some hundreds of names have for the first time been advanced, I was led to investigate for myself the sources whence part of them were derived, especially the works of Hübner. And the conclusion to which I have come respecting many of these newly proclaimed genera being directly the reverse of that of the author of the Sketch, I desire to state the case for the consideration of the readers of the ENTOMOLOGIST, who may naturally be supposed to feel an interest in whatever concerns any branch of Entomological nomenclature.

1. I have before me what purports to be a fac-simile of Hübner's Tentamen, "reprinted by Samuel H. Scudder, Cambridge, U. S. A., 1873." It comprises a single leaf, without date, the printed matter measuring 7 x 9 inches, and covering both sides of the leaf; and is entitled Tentamen determinationis digestionis atque denominationis singularum stirpium Lepidopterorum, peritis ad inspicendum et dijudicandum communicatum, a Jacopo Hübner. An Attempt at Classification of the several groups of the Lepidoptera, communicated to skilled persons to be examined and pronounced upon.

In this Attempt, the Lepidoptera of all orders are divided into Phalanxes, Tribes, and a farther division not named, but which, from the analogous arrangement in the Verzeichniss bekannter Schmetterlinge, are Stirps; and so far as relates to the Butterflies, the classification is as follows:

4. Zutraege zur Sam'l. Exot. Schmett.
 5. Verzeichniss bekannter Schmetterlinge.
 6. Systemat. Alph. Verzeichniss zur Samml. Europ. Schmett.
- Of these, No. 3, begun 1806, was continued to 1833 by Geyer.
Vol. 1, 413 pl., title, Index, and 12 pages text.
Vol. 2, 225 pl., title, Index.
Vol. 3, 21 pl.

Of No. 4, begun 1818, continued to 1833, were published Vols. 1, 2, 3 and 34 pl. of iv., but without text. No mention is made in Geyer's list of the Tentamen.

In Thon's Entom. Archiv., Jena, July, 1827, Vol. 1, p. 28—30, Geyer has given a biographical sketch of Hübner, in which he states that Hübner was first a designer in a cotton factory near the Moldavian frontier; was entirely self-taught, but studied the Lepidoptera diligently. That Geyer became acquainted with him and worked with him from 1818 onward, and he continues thus: "but as in the beginning Hübner felt the necessity of a natural system to be able to give accurately the limits of all groups of the Lepidoptera, he printed a *provisional sketch* after the principles of Linné, Fabricius and Schiffermueller, on a quarto sheet, which later was enlarged and published with the title *Verzeichniss bekannter Schmetterlinge*, 1816, 8vo. What he believed erroneous in this work (*Verzeichniss*) he tried to amend in his *Lepid. Zutraege*," published 1820. Geyer then gives a list of Hübner's works, same as that given in the Rev. Ent. before cited, and makes no mention therein of the Tentamen. Mr. Scudder, Hist. Sketch, p. 98, speaking of the Tentamen, says: "It is also included by Geyer in his list of Hübner's works." What Geyer says we have seen. The Tentamen is included in neither of his lists of Hübner's works, but apart from the list, in Thon's Archiv., a "provisional sketch," not even specified as the Tentamen, is stated to have been made, which later was published as the *Verzeichniss*. The very word used by both Geyer and Hübner—a sketch—implies incompleteness, and means a rough draft, an outline, and cannot possibly be construed to mean a "work," which is a completed structure, and in this case a completed book. Dr. Hagen calls my attention to the fact that Geyer's words, as well as Hübner's own in the Preface to the Verz., (*er machte bekannt*.) to-day mean *published*, but that formerly they were applied to any printed slip, and as used by Hübner and Geyer are equivalent to "*printed*," as I have translated them. The difference between printing and publishing I need not dilate upon,

Such, then, is the history of this now celebrated sheet, printed in 1806 by Hübner as a Sketch, or rough draft, for his own use and for the examination of some learned persons, expressly stated by him to have been subject to their approval *before even he himself would embrace it*, never known to have been approved by any one, never claimed to have been more than a "provisional sketch" or draft of the book which in 1816 was published as the Verzeichniss, and which differs materially from the draft, as would any completed and published book or paper from the original draft of same, discovered by Mr. Scudder seventy years after it was printed and nearly as many after it had been forgotten, and proclaimed by him as an authority in nomenclature, not only over the Verzeichniss, which is its other self, but over all works of Hübner, and all works of all authors since 1806, superseding—wiping out as with a sponge—the labors of three generations of Entomologists. And plainly, if this little Sketch can claim of right such prodigious distinction, the nomenclature of every department of Natural Science is at the mercy of any leaf or printed slip which may hereafter be discovered in the attics or the junk-shops of the civilized world. It becomes us therefore to scrutinize this sheet closely.

Mr. Scudder relies upon the mention of the Tentamen in the Verzeichniss, and upon a reference to what is understood to be the Tentamen in the preface to the Lepid. Zutraege, but in which the name or the title does not appear; also to a reference by Ochsenheimer, and later by Dr. Hagen in the Bibliotheca Entomologica, 1862, as evidence that it was known to Entomologists for years as an existing work, *and by implication that it was recognized as a work having authority.*

Hübner's own references, whether direct or indirect, proved nothing, and as to that in the Biblioth. Ent., Dr. Hagen informs me that when he mentioned the Tentamen in that work, he had never seen it, and knew it only from Ochsenheimer's mention, and now that he has seen it, he is explicit in his rejection of it as having either authority or value.

Ochsenheimer, Schmett. Eur. iv, 1816, says: "Hübner has under the title Tentamen, &c., published on a quarto sheet a sketch of a system of Lepidoptera, in which to the divisions adopted by him are given generic names of unequal value. Hubner seems to be aware of this himself, for he says in concluding, 'let no one suppose that this arrangement will require no farther correction.' *This sheet I saw only long after the printing of my 3rd Vol. was done.*" This was then after 1816, as

Ochsenheimer's 3rd Vol. bears date that year. Mr. Scudder has inadvertently copied this as 1st Vol., 1807, instead of 3rd Vol., 1816. So as Dr. Hagen, in a note, says, "the Tentamen was not known to the chief Lepidopterologist of his day for ten years or more after it was printed, though he was in intimate communication with Hubner, and that he did not know it shows clearly that Hubner did not think it of importance enough to be communicated to him."

Herrich-Schaeffer, in different Regensburg pamphlets, 1857-1869, states that he has bought all the plates, books and scientific material belonging to Hubner, and will continue Hubner's works. He gives a list of them, with dates of their original publication, and includes the Verzeichniss bek. Schmett., and the Syst. Alph. Verz. (which is another catalogue), but says not a word of the Tentamen, the best proof that he did not regard it as a scientific publication.

Dr. A. Speyer, Ent. Zeit. Stett., 1875, Vol. 36, p. 98, thus expresses himself: "Grote swears by the priority principle and has vigorously carried out the same, not only in regard to species, but to genera and higher divisions. He has laid hold of a yet older catalogue of Hubner's than the Verzeichniss in the Tentamen, &c. *I have never met with the Tentamen, which, according to Ochsenheimer, contains a plan of a system of Lepidoptera, on a quarto sheet, and neither I presume have most of my readers. I have therefore been obliged to pass no judgment on the right of those generic names to supersede later ones chosen by Hübner himself or by others.*"

"The Tentamen is not recorded in the large yearly Index of all German publications," as I am informed by Dr. Hagen, "published at Leipzig, which Index is regarded as the most correct existing." And the same distinguished Entomologist also assures me that he himself "has most of the catalogues of the libraries belonging to prominent Entomologists, and which have been offered for sale during the past forty years, and the Tentamen is not mentioned in one of them, not even in those of Zincken-Sommer, Charpentier and others who were contemporaries of Hubner and were prominent and accomplished Lepidopterologists. These men and Ochsenheimer and Germar were the '*peritis*' of their time and there is no evidence that one of them had seen it; and," adds Dr. Hagen, "*a work in nobody's hands, printed for private purposes, cannot be considered as a scientific publication.*"

So that this sheet, so far as appears, was known to German authors,

who of all the world might have been supposed likely to have been familiar with it if it ever had been published or had any scientific value, only by the mention of it in the Verzeichniss, of which it was the original sketch, or from the mention in Ochsenheimer, who says he did not know of it till after 1816, that is, till after the Verzeichniss was published, and through the mention in the preface of that work he probably got his first information about the Tentamen.

And it is worthy of notice that from 1806 to the present day, *scarcely one of the German lepidopterists have recognized any of Hübner's works as authoritative in nomenclature.* This movement in favor of Hubner originated in England with a small number of authors, and quite lately has been extended to the United States by the efforts of Messrs. Scudder and Grote.

In the year 1842, the British Association appointed a Committee composed of the most eminent zoologists of the day, to draw up and report a code of Rules "by which the nomenclature of zoology may be established on a uniform and permanent basis." The committee submitted to the Association a series of propositions that same year, 1842, which were adopted. In 1845, a Committee appointed by the Association of American Geologists and Naturalists, adopted the rules of the British Ass'n with slight alteration.

Rule 12 reads as follows: "*A name which has never been clearly defined in some published work should be changed for the earliest name by which the object shall have been so defined.*" And in the explanatory text accompanying, the Committee of the Br. Ass'n say: "Two things are necessary before a zoological term can acquire any authority—*definition and publication. Definition properly implies a distinct exposition of essential characters, and in all cases we conceive this to be indispensable. To constitute publication nothing short of the mention of the above particulars in a printed book is sufficient to authenticate a genus. . . . Nor can any unpublished description, however exact, claim any right of priority till published, and then only from the date of publication.*" In a printed book! Not on a stray slip nor on a loose sheet, nor in the columns of a newspaper, but in a book, that its permanence may be assured and that it may be known of by all men.

Geyer says that Hubner published his provisional sketch in an enlarged form as the Verzeichniss; and Hubner says "let no one suppose that this arrangement will need no farther correction." And accordingly we

see that Hubner does not use the names of the 13 secondary divisions of the Papiliones of the Tentamen at all in the Verzeichniss. The species *Polymnia*, for instance, stands in the former as "*Nereis Polymnia*;" in the latter it is *Mechanitis Polymnia*; *Potamis Iris* is changed to *Apatura Iris*, and so on through the entire list. And only a part of the Stirps of the Tentamen are retained in the Verzeichniss, five of them, namely, all the Gentiles, being changed for others, as *Principes* to *Archontes*, &c. Moreover, one Stirpsin addition is given to each Tribe.

Yet the author of the Sketch, in disregard of Rule 12, has given the names of these 13 secondary divisions of the Tentamen as so many names of genera, crediting them to Hub., 1806. Thus *Nereis* Hub., 1806; *Consul* Hub., &c., adding to each the species accompanying it in the Tentamen, with the words "sole species and therefore type." These names have never been used, and several were dropped by Hubner himself, but the systematist of to-day must *reinstate* them, as he terms it, as if they had ever had one moment's standing, and claims for them an honest priority over the labors of other men. And not only has Mr. Scudder given a set of names based upon these divisions of the Tentamen, but a complete set of other names for the equivalent divisions of the Verzeichniss. Thus Hubner, as I have said, changed all the Stirps of the Gentiles, *Principes* into *Archontes*, *Rustici* into *Astyci*, &c., and we have in the Hist. Sketch a genus *Princeps* and a genus *Archontes*, a *Rusticus* and an *Astycus*, each pair in Hubner standing for precisely the same thing. But apparently to escape the appearance of their duplication, the last set are attributed to "Franck's Catalogue," a production much subsequent to the Verzeichniss and of which I will speak presently.

But to return to the Tentamen. In the Hist. Sketch we read "*Potamis* Hub. Tent., 1806; *Iris* sole species and therefore type. This name never since used must be restored." "See *Apatura*." Turning over the leaves we find "*Apatura* Fab." and three species ranged under it, *Iris*, *Bolina* and *Alimena*, and read: "in 1806 Hubner (Tent.) selected *Iris* as type of *Potamis*. Consequently *Apatura* must be restricted to the other two, which are congeneric, and *Bolina* may be taken as the type. This, however, is not in accordance with subsequent usage (from 1806), as will be seen by the following," &c. And then are given a dozen authors, including Hubner himself in the Verzeichniss, nearly every one of whom has employed *Iris* as the type of *Apatura*. And Mr. Scudder adds with amusing naiveté, "this result is from want of familiarity with Hubner's Tentamen!"

Beyond a question, the Tentamen, though historically interesting, or as a curious fossil, has not the least value as an authority for nomenclature, and these 13 genera set up by Mr. Scudder must come down.

The other Phalanxes of the Tentamen, and which cover about 80 per cent. of that sheet, relate to the Heterocera, and I shall not say more of them at present than that they one and all are subject to the same fatal objection with the Papiliones; and any system of arrangement based upon these divisions is worthless.

2. In the year 1825, a certain collection of Lepidoptera owned by the late M. Franck was offered for sale by his widow, and Hubner was employed to draw up a sale catalogue, a copy of which, from the Mus. Comp. Zool. Camb., I have examined. It is entitled "Catalogue de feu M. Franck, cette collection est en vente chez Mme. Ve. Franck, a Strasbourg." Near the end is a classified list of all the species embraced in it, divided according to the Stirps of the Verzeichniss, merely the names and the habitat being given, as *Archon Polydamas* L. Brazil, *Astycus Proteus* L. Surinam. Now these names are not generic names in this Catalogue unless the Stirps names in the Verzeichniss are also generic names. They, as well as the Stirps names, are given to what modern systematists call a Family or sometimes a Sub-Family. For example, *Andropodum* in this Catalogue embraces 44 species, including all the modern genera of the Family or Sub-Family Pieridæ, as *Pieris*, *Anthocharis*, *Colias*, *Terias*, *Callidryas*, *Gonepteryx*; and it is identical with the Stirps *Andropodum* of the Verzeichniss. Under *Archon*, which is equivalent to Papilionidæ, stand *Papilio*, *Leptalis*, *Thais*, *Parnassius*, and so on. It is plain, therefore, that these names are in no sense names of genera. And yet Mr. Scudder has set up several of them as names of genera, being, as I have mentioned before, all those which Hubner substituted in the Verzeichniss for the names of the Tentamen. But instead of taking them directly from the Verzeichniss, he seems to have adopted a round-about method. On page 93 Hist. Sketch, he says: "Only those names" (of genera) "are introduced which are connected with the binomial nomenclature founded by Linné; for this reason the trinomials of Hubner" (such as *Orcas nubila Norina*, *Andropodum fugax Palaeno*, etc., astonishing appellations used in the iconographic works of Hubner) "and other writers have been totally disregarded. All or nearly all the trinomials of Hübner are actually used by him in some work or other, in the Tentamen or Franck's Catalogue, with a binomial application, and in those cases they are here introduced, but only dating from the time at which

and for the species for which they were employed binomially." Now, here is *Andropodum* in Franck's Catalogue, precisely the equivalent of *Mancipium* of the Tentamen (which latter is already set up as a genus in the Sketch and stamped Hüb., 1806), and is substituted for it in the Verzeichniss, employed to cover 44 species belonging to many genera. Mr. Scudder pounces at random on one of these, which happens to be *Ilairé*, and stands it up as type of the new-old genus *Andropodum* Hüb., 1825, not taking the trouble to first pull down *Mancipium*. I have not examined the Zutraege, and for aught I know there may be a third equivalent of *Mancipium* found there, which also is one of these genera. Geyer says that what Hübner thought erroneous in the Verzeichniss he tried to amend in the Zutraege, and he may not unreasonably have seen fit to amend his Stirps' names the second time. Certainly, had he done so, we should have triplicate genus names in the Hist. Sketch. For some reason not stated, Mr. Scudder has attributed the name *Archon* type *Machaon* to the Syst. Alph. Verz. 1825, instead of to Franck's Catalogue, 1825, where its compeers are found, in disregard of his own statement before quoted as to the use of the trinomials—for in the Syst. Alph. Verz. the species *Machaon* stands as *Archon heroicus Machaon*.

Of course Franck's sale Catalogue, as regards authority in nomenclature, does not differ from Deyrolle's (Paris) sale Catalogue, or that of any other professional dealer in insects. I have a catalogue of a dealer in flower seeds, from Ipswich, England, in which all the names are arranged under the latest approved botanical system, and accompanying each is a brief indication of the habit, color and nature of the plant. This catalogue would scarcely be allowed by Dr. Gray to have authority in botanical nomenclature, and yet it has as much claim to that dignity as this Franck Catalogue, and in fact more, as it gives some sort of description of each plant mentioned.

We may infer, then, that zoologists have not merely to rummage for drafts and printed slips, but for sale catalogues as well, before they can reach the right basis of their nomenclature!

In the Historical Sketch are about 40 other genera attributed to Hübner on such authority as Syst. Alph. Verz., Index, Sammlung, exclusive of a host based upon the coitus of the Verzeichniss bekannter Schmetterlinge, and these one and all will be found to bear examination no better than the so-called genera from the Tentamen and Franck's Catalogue. They all lack the essential qualities of genera, being taken

from works in which they stand as bare names, undefined and undescribed.

3. In the Preface to the Historical Sketch we naturally look for a statement of the plan upon which the author has worked, and the principles on which he relies for the correct exposition of generic names. And we read that he adopts in general—not the rules of the British Association—but those principles regarding genera enunciated by Agassiz, and more recently by Dr. Thorell in his work on European Spiders, “*with such exceptions and modifications as are indicated in my Canons of Systematic Nomenclature*” (published in Am. Jl. Sci. and Arts, May, 1872). Agassiz not being at hand, I turn to Thorell as quoted by Wallace, Anniv. Address, p. 10, and read: 1. “*There must be definition and description and publication. A recognizable figure of a species is sufficient, but of a genus there must be a description pointing out the generic characters.*” And Thorell adds: “*A new genus that has been distinguished merely by referring to some particular species of an older genus as its type, without in any way indicating which of the* CHARACTERISTICS OF THE SPECIES IS TO BE CONSIDERED AS THE MARK OF THE NEW GENUS, NO ONE CAN BE LOOKED UPON AS BOUND TO ACKNOWLEDGE. Nevertheless, it appears to me advisable to do so if the species referred to deviate in any generally known way from the typical species of the old genus, and always if the new genus has been once received and acknowledged.” With the proposition laid down in the first part of this clause I fully agree, and it is in accord with the Rule of the Br. Ass’n. The last part is advisory, and taken with the other, means that while Dr. Thorell would concede a standing to genera already adopted and in use, he would require definition and description and publication in future, and would permit no genus to be based on a mere reference to a type, except in one extraordinary case, that of a well known variation from the typical species of the old genus. This advisory clause expresses an individual opinion and is propounded for the consideration of naturalists. But were it a law, it would afford scanty support to these new Hübnerian genera. There is no evidence that in any one of those taken from the Tentamen or from Franck’s Catalogue, etc., the typical species designated by the author of the Hist. Sketch differs in any generally known manner from the remaining species of the old genus, and certainly these genera have not been received and acknowledged.

And what are the “exceptions and modifications” indicated in Mr. Scudder’s Canons? Canon 3 reads: “The mere enumeration of its

members when known is a sufficient definition of the limits of a group and gives it an unquestionable right to recognition." That looks rather like a reversal of Dr. Thorell's Rule than a modification of it, and it is the foundation on which these late innovations rest. What right has any man to lay down a Rule or propound a Canon at variance with the received Code, and then assume that his Rule or Canon has the force of law? The Rules of the British Association were adopted by the representatives of the different branches of zoology, assembled in convention, and they have been accepted and acted upon. If any of them need modification or repeal, such change must proceed from as high an authority as that which enacted them. We may reverence or respect the opinions of an Agassiz, or a Thorell, or a Scudder, but in these matters to consider opinions as so many laws would be to establish a dangerous precedent, and cannot for one moment be tolerated.

Under another of these Canons Mr. Scudder has undertaken to apply the rule of priority to groups higher than genera, as follows: "In any subsequent alteration of the limits of a group its name must never be cancelled." And accordingly we are requested to introduce a host of barbarous family and stirps names, to the utter confusion of the received nomenclature of the higher groups. The Committee of the Br. Ass'n, on the contrary, not intending to apply the rule of priority to these groups, recommended "that the assemblages of genera termed families should be uniformly named by adding the termination *idæ* to the earliest known or most typically characterized genus in them, and that the subdivisions termed sub-families should be similarly constructed with the termination *inæ*." And this recommendation has been accepted and generally acted on because this mode of designating families and sub-families, being uniform and an aid to memory, was found eminently convenient. It was regarded as a vast improvement on the fantastic and heterogenous names of the earlier authors and of Hübner especially. But the effect of this Canon would be to swamp our nomenclature with such terms as *armati* and *hypati*, *argonautæ* and *moderatæ*, *adoleocentes* and *terribiles*, *frugalia* and *voracia*, and hundreds more equally absurd. And already we find the writings of Mr. Scudder defaced and obscured by them. This is making progress backwards, and in my opinion is as sensible as if we were to surrender the Indian numerals for the letters of Rome, or the notation of chemistry for the hieroglyphics of the alchemist, or railroads for buck-boards and pillions.

And although this Canon purports to relate only to groups higher than genera, the same reasons which would favor such an application cover genera also. And accordingly we find of late several entomological systematists wholly ignoring the Rule which requires definition of genera, and in the most reckless fashion indicating genera by the mere mention of types.

Of the 1,104 generic names in the Hist. Sketch, 283 are taken from the Verzeichniss bekannter Schmetterlinge, a work of which I propose to speak in a subsequent paper, and 57 are taken from the Tentamen and other works of Hübner, making a total of 340, or about 30 per cent. Scarcely one of all these can stand without displacing a name applied, with requisite definition and publication, by Doubleday, Boisduval, Westwood and other eminent authors, and the aggregate represents a vast sum of injustice.

NEW CALIFORNIAN AND TEXAN MOTHS.

BY LEON F. HARVEY, A. M., M. D., BUFFALO, N. Y.

(Concluded from February No., Page 38.)

Hadena Dunbari, n. s.

Eyes naked, tibiae unarmed, tufting of body obsolete, so that it approaches *oligia*, but is stouter than those species. Fore wings light gray, basal line black, distinct; t. a. line geminate, black outwardly and white inwardly, irregular; t. p. line geminate, produced above the reniform, curved outward, joining the reniform inferiorly. Median shade black, distinct. Orbicular round, white, with black annulus, with a dark centre; reniform subquadrate, black margined, having a carneous centre; claviform outwardly well expressed, concolorous, with a black border; s. t. line white, dentate, preceded by a black streak, obsolete opposite the reniform; an apical black streak. White dots on the costa in the s. t. space. Terminal line black, fringes concolorous and finely cut with white. Beneath cinereous; light outer border with terminal line well marked. Median shade quite evident on costa; alternate white and black costal marks. Hind wings smoky white, veins soiled, fringes

white. Beneath concolorous, a discal lunule, with median and terminal lines obvious. Body concolorous; collar with a black line; black line at base of thorax; beneath, thorax and legs of a lilac shade. Abdomen whitish brown.

Vancouver Island, No. 5582, Coll. Mr. Hy. Edwards. Named for Dr. George W. Dunbar, of Buffalo, a zealous collector.

Hadena chlorostigma, n. s.

Eyes naked. Thorax blackish brown, tufted, edged with black; collar brown; sides and dorsal surface of body tufted. Primaries black, tinged with green; basal half line greenish; t. a. and t. p. lines narrow, black, geminate, accompanied by pure white shadings. In the character of the median lines this species resembles *chalcedonia* and *versicolor*. Median shade noticeable, blackish. Orbicular spot round, concolorous, ringed with black; reniform subquadrate, green, moderate, bordered with black; claviform minute, black. Beneath blackish, pale, irrorate; straight median line; discal spot on the line; subterminal fuscous shade; white spots on the costa, near the apex. Secondaries smoky, black, beneath median line denticulate, followed by subterminal fuscous shade; fringes short, paler.

Expanse 22 m. m. May 22nd, No. 544, violet label; G. W. Bel-frage, Texas.

Perigea niveirena, n. s.

This species is of a mottled fuscous with distinct black, single waved transverse lines; the small reniform outwardly white margined. Subterminal line white, dentate, preceded by a blackish shade. Hind wings fuscous, paler beneath, with even common shade line and discal spot. Body concolorous.

Expanse 30 m. m. Vancouver Island, No. 5621; California, No. 5199, Coll. Mr. Hy. Edwards.

Gortyna obliqua, n. s.

♂. Resembles the Eastern *G. nitela*, but the pale t. p. line is more oblique, angulated immediately on costa. The color is more reddish brown. T. a. line outwardly angulate on median vein, thence downwardly straightly to internal margin, thus narrowing the median space inferiorly. Stigmata visible, paler than the wing, rounded. Subterminal

line a light shade line, twice angulate, nearly opposite the cell and on inferior border. Subterminal space lighter than the stigmata. Hind wings pale, beneath with faint dot and line.

Expanse 36 m. m. No. 4410, California, Coll. Mr. Hy. Edwards.

This is the first Californian species congeneric with the Eastern species referred by Gueneé and Grote to *Gortyna*. The clypeal spine of *Ochria* is absent.

Caradrina flavimaculata, n. s.

♂. Wings elongate; primaries narrow, secondaries wide. Fore wings pale, fuscous with perpendicular, waved, darker transverse lines. Orbicular yellowish, small, rounded; reniform concolorous, small, with internal streak. A terminal series of black dots, preceded by a waved pale line. Hind wings pellucid white, with a terminal linear shade, soiled on the veins.

Expanse 30 m. m. Oregon, No. 6003; California, No. 3481. Coll. Mr. Hy. Edwards.

Graphiphora pulchella, n. s.

♀. Eyes hairy; head sunken; thorax untufted. Purple brown; terminal space lilac gray; costa shaded with lilac gray. Transverse lines dark, evident, denticulate; t. p. line geminate, forming a prominent series of points followed by gray dots; both lines followed by gray shades. Stigmata concolorous, edged with black and gray; orbicular sub-quadrate; reniform sub-equal, elongate, oval, slightly constricted at centre. Thorax purple brown. Hind wings and abdomen fuscous; beneath the wings are pale with a red flush, common lines and discal dots.

Expanse 33 m. m. No. 2921, California, Mr. Hy. Edwards' Coll. The handsomest species of the genus known to me.

Calymnia calami, n. s.

Antennae brown, palpi whitish, smaller winged and more slender than *orina*. Differs from it in the light yellow of the primaries. The median lines are trapezoidal, more nearly approaching each other at the inferior border, white with a dark shade internally. Reniform white margined, slight constriction externally. Orbicular round, small, with a white annulus; terminal line inconspicuous; fringes concolorous. Beneath of an ochreous shade, much like *orina*. T. p. line evident. Secondaries white, tinged with yellow, lines obsolete. Thorax and body concolorous

with primaries above ; legs of the color of the under surface of primaries.

Expanse 30 m. m. Violet label, Mr. G. W. Belfrage, Bosque Co., Texas.

Lithophane Oregonensis, n. s.

Allied to *Georgii*, but paler gray, with the orbicular slightly extended below median vein, in which respect it resembles *laticinerea*. Whitish gray ; a fine basal black line. The geminate, acutely dentate median lines apparent on costa. Reniform with red central shade, black ringed, incomplete ; cruciform black marks before the subterminal line apparent. Median shade noticeable on costa. Head and thorax whitish gray ; black lines on the outside of the tegulae. Hind wings fuscous, with lunule. Body fuscous, with a red tinge. Thorax and legs gray beneath. Front and collar with a black line. Beneath light fuscous, with a light red stain and very distinct lunule on hind wings.

Expanse 45 m. m. Oregon, No. 5600, Coll. Mr. Hy. Edwards.

Lithophane carbonaria, n. s.

♀. A species with naked eyes, flattened abdomen and with untufted thorax, with the sides angulated, but very different in color from any known species, looking distantly like *Macronoctua onusta*. Primaries dull black shading into brownish toward internal margin. Lines geminate, apparent as darker shades. Orbicular spherical, concolorous ; reniform medially constricted, showing some powdery pale scales lining the annulus and centrally. Subterminal line preceded by black dots superiorly, pale ; fringes brownish. Hind wings smoky fuscous ; beneath paler, irrorate, with discal lunule. Fore wings beneath showing costal white dots. Head, thorax and legs blackish.

Expanse 36 m. m. No. 4417, Mr. Edwards' Coll.; California.

Thalpochares elegantula, n. s.

White. Primaries slightly yellowish, with a median brown line edging inwardly a brown fascia with a purple shade, and which encloses the round black edged reniform mark. Traces of the t. p. line beyond this may be made out. Apices and fringe touched with brown. Hind wings and body white ; beneath the fore wings are smoky.

Expanse 18 m. m. No. 2579, Nevada, Mr. Hy. Edwards' Coll.

I hardly think December in Buffalo has ever been known to produce moths, yet I have to record the capture, on the 21st of December last, of a specimen of *Orgyia leucostigma*, by Miss Mary Walker, probably the contents of a late fall chrysalid, urged to escape by the unusual warm weather of the season.

ON GENERA AND THE LAW OF PRIORITY.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The writers who are engaged in the work of giving us an account of the different kinds of Butterflies and Moths inhabiting North America, seem to fall into two categories with respect to their ideas of classification. As in other departments of Natural Science, the Entomologists differ principally in their conception of what constitutes a genus. They are either *lumpers*, making their genera very wide, or *splitters*, making their genera restricted and dependent upon less conspicuous details of structure. And the different writers display as many phases of the two ideas, so that, with respect to any one individual, we may not certainly classify him without attention. Feeble *lumpers* may be recognized by their admittance of a few more obvious genera even when these have been proposed by representative *splitters*. Feeble *splitters* may be known by their admission of sub-genera, or sub-generic divisions. Again, the *lumpers* may be divided into *intelligent lumpers*, who, for the most part, may be aware of the minutest differences in structure offered by the objects of their studies, but who fail to consider these differences as worthy of expression in generic nomenclature; and *unintelligent lumpers*, who fail in perception and in knowledge alike. Numerically speaking, the *lumpers* are in the ascendant, perhaps in the proportion that it is easier to appreciate general resemblances rather than minute agreements. As the rule, it is the *lumpers* who attack, but, strange to say, it is not so much the method of the *splitters* that they attack by a display of argument drawn from fact, but the application of zoological rules of nomenclature and the operation of the law of priority in scientific writing. As a rule,

the *splitters* have here the advantage from their more extended reading. With them it was a greater necessity that their more numerous genera should be correctly named, and they have been at pains to adopt from older writers, like Hübner, all the generic names they could legitimately use under the received zoological rules of the British Association. A want of comprehension of these rules which seems almost deliberate, has induced Mr. Strecker to attack the term *Cressonia*, now in use for *juglandis*, one of our Phalaenoid Sphinges, under the plea that it is synonymous with *Polyptichus*, whereas it was *originally* shown that *juglandis* was included with *all* the eyeless Phalaenoid Sphinges known to Hübner, and that, when it was found to differ from *all* of these, a different term was properly proposed for it, leaving *Polyptichus* to be used for one or more of the species included under it in the Verzeichniss. This by way of illustration.

With regard to the attack on the law of priority, or rather, its application by the *splitters*, this much seems reasonable, that, if its application defeats the end of Entomology, which is to give us exact knowledge of our insects, it must be modified or abandoned. To write merely to vindicate an application of any code of rules at the risk of confusing the study for the furtherance of which such rules have their excuse for existing, cannot be defended. If the law of priority cannot be extended so as to include Hübner, without endangering the study of Entomology, it would be advisable to drop Hübner.

The real contest does not seem to us to be about Hübner, although Hübner and his generic names and ideas have afforded the most popular, if not the most vulnerable point of attack to the *lumpers*. It is rather between the sets of ideas which we have described with regard to the value of genera. To illustrate: The N. Am. Phalaenoid Sphinges have been divided among the genera *Smerinthus*, *Paonias*, *Calasymbolus*, *Amorpha* and *Cressonia*. Objections are made against the use of Hübner's terms as here applied. Would it be any advantage to have ignored these and substituted new or different ones? Obviously, not. These terms are then as good as any others, provided they are to stand at all. And now let us look without impatience at these genera. What is the question which at this time is *the* question among naturalists. Is it not rather the question of how all these different species and genera came about, rather than a mere cataloguing of them for convenience sake? And will not, therefore, any system of classification which expresses more clearly the inter-relationship through slight modifications of structure, be the classifi-

cation which thinking men will adopt? Now, in ignoring these slight modifications of structure in the case of the Phalaenoid Sphinges, we should have to lose sight of the fact that at least three of the American genera have no representatives in Europe, that the European *ocellatus* is represented in America by strictly congeneric species; both of these facts, which seem to us of great importance to know, would be obliterated by a lumping of the species indiscriminately under one generic name. In the case of one of these genera, *Cressonia*, it is known that it was incorrectly held by Dr. Clemens to represent the European *populi*, that the correction has been made, that its right to a separate consideration has been made plain. What is to be gained toward the solution of the great question of the development or origin of these species by overturning this work? Are we not able, indeed, to grapple with this question at a better advantage when we know all the facts in the case, than when our classifications are so deceptive as to embrace different kinds of structure under a common generic name? The mental operation by which we recognize "genera," is evidently the same kind as that by which we recognize "species." Both of these are alike abstract conceptions; they have the same basis for existing in our minds and books.

In so far as the new generic ideas seem a development of the old, and in consonance with our increase in knowledge, we may trust to them. It is well also that the *lumpers* have their say and full weight; for undoubtedly extreme cases of splitting have to be corrected, and extreme applications of the rules of priority have to be rejected as leading to no useful results to science, which should be the criteria for all scientific action. And with all these varying counsels we still can be reasonable with each other in our common cause; imputing no evil and overcoming each one his own unreasonableness so far as he is able. An adverse criticism from which there will be no appeal may fall on those of us who do not recognize the current scientific thought, but waste their opportunities in useless controversies, showing no appreciation of the scientific value of Entomology.

ENTOMOLOGY AT THE CENTENNIAL.—The Entomological Society of Ontario has forwarded a very fine collection of Canadian insects to Philadelphia, consisting of eighty-six cases, forty-five of which are Lepidoptera and twenty-seven Coleoptera, the remainder being occupied by the other orders.

CORRESPONDENCE.

ENTOMOLOGICAL NOTES FROM THE COUNTY OF PETERBORO, ONT.

DEAR SIR,—

As no work, or but very little, can be carried on at this season out of doors, in aid of the objects you have in view in the publication of the CANADIAN ENTOMOLOGIST, I forward a few extracts from my note book of last year.

April 5th, 1875. I captured a fully developed specimen of that very troublesome butterfly, *Pieris rapæ*, in my garden, the thermometer having been only 1° above the freezing point on the preceding night, and not having risen beyond 38° during the entire day.

The *Pieris* was not nearly so destructive to my plants in 1875 as it was in the previous year, inasmuch as in the fall of that year I had discovered and destroyed some hundreds of chrysalids that had attached themselves to the inside of the doors and walls of my tool-houses, and beneath my verandah-roof. In 1874 my cauliflowers and cabbages, during my frequent absence from home, were well nigh eaten up by this garden pest, and such as were not actually devoured were rendered unfit for use by the quantity of excrement deposited between the leaves of the plants. A sprinkling of buckwheat flour was suggested as a remedy, but I tried it without effect.

May 16. The mischievous flying and hopping *Haltica striolata* was swarming in my melon-frames. I dusted the plants with soot, which appeared to disagree with their constitution and prevented their effecting any material damage. I have sometimes tried sprinkling the plants with tobacco water, which forces them to retire to the outside of the frame, where they can readily be destroyed before they recover from the effects of the tobacco.

May 24. The first Potato Beetle, *Doryphora decem-lineata*, made its appearance—not on my potato plants, for, since the advent of that interesting “bug,” I have preferred purchasing to growing potatoes—but on my egg-plants and tomatoes, both of which plants belong (or rather belonged, for the tomato is now *Lycopersicum esculentum*) to the *Solanums*, as does the potato. I have generally found that where potatoes and egg-plants are grown in the same garden, the Colorado beetles attack the

latter with even greater voracity than they do the former. My remedy, as regards the egg-plants, is hand-picking two or three times a day, a remedy where, from the size of the garden, it can be adopted, the most efficacious that can be devised.

June 5. The *Nematus ventricosus* appeared upon the currant bushes. A watering with hellebore and water proved, as usual, an unfailing specific.

June 16. I captured an *Elater oculatus*.

June 19. *Sesia diffinis*.

June 24. *Saturnia io*, ♂, $2\frac{3}{4}$ inches in expanse.

July 4. The Fireflies, *Lampyris corusca*, first appeared, enhancing, by their glittering, glancing evolutions, the charms of the evening hours.

July 10. I captured a *Saperda tridentata*.

August 17. *Buprestis Virginica*.

August 19. Camping out with a party on one of the granitic islands of our most beautiful and romantic Stony Lake. Saw a large number of those exquisite little beetles, the *Chrysochus auratus*.

August 20. Red Admiral butterfly, *Vanessa atalanta* (Westwood).

August 26. *Arge* tiger-moth.

August 28. *Silpha vespillo* (Samouelle).

August 30. *Buprestis dentipes*.

September 5. I captured in my garden a good specimen of that very lovely moth, *Deiopeia bella*.

September 20. Found a common cricket, *Acheta abbreviata*, with a hair snake, *Gordius*, attached to it. Whenever the unhappy victim moved the snake appeared to lash itself into a perfect fury, twisting itself around the cricket in all directions.

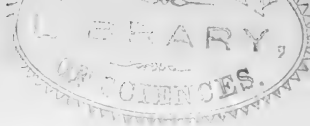
October 20. I found a chrysalis of the Five-spotted Sphinx, *Sphinx quinquemaculatas*, which I now have by me still alive.

On the same day, the thermometer on the preceding night having run down to 32° , I captured a brilliant specimen of *Vanessa progne*.

October 21. Dug up in my garden a quantity of grasshoppers' eggs enclosed in a pellicle of dried varnish.

VINCENT CLEMENTI, B. A.

Peterboro, January 28th, 1876.



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THE RELATIONSHIP OF THE EARLY SPRING BLUES.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

The simple fact which Mr. W. H. Edwards published in this journal last May* has thrown great doubt over the relationship of all the American species of *Cyaniris*. From eggs laid in September, 1874, by *C. Pseudargiolus*, he reared in the following February *C. violacea*. From this fact he is led to conjecture that in W. Virginia, where his experiments were made, *C. neglecta* may prove to be a goneutic form of the same species, reducing the entire series in that district to one. He also infers that further north *C. Lucia* and *C. neglecta* are forms of one species, though how this can be reconciled with the previous conjecture he does not explain.

Against the inference concerning *C. Lucia* and *C. neglecta*, Messrs. Saunders and Lintner reasonably urge† that *C. Lucia* is unknown in well worked districts where *C. neglecta* is abundant. This would at first seem to disprove any such relationship between them; but when it is remembered that *C. Pseudargiolus* exists in abundance in California, in districts well explored by resident collectors, while *C. violacea* (raised by Mr. Edwards from *C. Pseudargiolus*) has not yet been found; then we must conclude either that the *Pseudargiolus* of California is a different species from the *Pseudargiolus* of W. Virginia (whereas specimens from the two countries are wonderfully alike), or else that *C. neglecta* may be genetically preceded by *C. Lucia* in one place and not in another.

In writing to Mr. Edwards I also objected, as he remarks in a note appended to his paper, that in Massachusetts *C. neglecta*, *Lucia* and *violacea* all appear in May; but this statement, as Mr. Edwards surmises, is incorrect, and must have been made from memory. To illustrate the subject

* Vol. vii, pp. 81-2.

† This journal, vii, pp. 82

I append to this paper full extracts from the account of the different species of *Cyaniris*, as written several years ago for my book on New England Butterflies, omitting only that of *C. Pseudargiolus*, as I had nothing to add to Mr. Edwards' account in the "Butterflies of North America."

These considerations, and the hypothesis presently to be offered, show that observations are needed in many different places upon the succession of the broods of all the forms of *Cyaniris*. Fruitful results would surely follow from a series of complete observations for a single season in such separated localities as W. Virginia, Philadelphia, the Catskills, Albany, Boston, the White Mts., Quebec, Montreal, London, Ont., Detroit, Chicago, St. Louis, Lawrence, Ks., Denver, Col., and San Francisco—all, excepting Denver and the mountains, places where there are resident collectors. The present article is written for the purpose of drawing attention to this point.

In W. Virginia, three forms of *Cyaniris* appear: First, one (*violacea*) of medium size, in which the spots on the under surface of the wings are of medium size and distinct, and the marginal markings are cloudy angular lunules; in which some females are wholly brown above, and others blue with a heavy brown border. Second, and later, one (*Pseudargiolus*) of large size, in which the spots on the under surface are scarcely more than dots and very light, and the marginal markings are cloudy angular lines; in which all the females are blue above, but with a dash of white in the middle of the fore wing. And third, occasionally, a form (*neglecta*) almost wholly like the latter, but smaller.

In Albany and London, which, zoologically speaking, are more southerly stations than the vicinity of Boston (or, rather, situations more accessible to southern influences), the second of the forms just mentioned does not seem to have been recognized.* As far as I am aware, the females of the first (*violacea*) are always blue.

In the neighborhood of Boston we have: First, a small species (*Lucia*), in which the spots on the under surface of the hind wings are very large, usually completely confluent and often suffusing nearly the whole base of the wing, and the marginal markings tend to form a broad band with serrate interior margin; in which the females, always blue, have seldom any trace of pale color on the upper surface of the fore wings.

* Lintner, however, catalogues it from New York.

Second (later), a form precisely like the *violacea* of W. Virginia, but with the female never brown. Third (still later), a form with faint markings corresponding to the *neglecta* of W. Virginia; occasionally in midsummer large specimens of this are taken, and these I have considered *Pseudargiolus*.

In all these places the earliest forms, or those called *violacea* and *Lucia*, have the disc of the upper surface of the fore wings of the female blue (excepting, of course, the brown females of the southern *violacea*), untinged or scarcely tinged with white; while the later forms always have a whitish blotch or dash on the fore wings of the female.

In California and Oregon three forms occur, but at what seasons I cannot say; two of these altogether correspond to the *Pseudargiolus* and *neglecta* of the East, while the third (*Piasus*) is as large as the former and has much heavier markings beneath, but the females are strongly marked with white on the upper surface of the fore wings.*

With this last exception, the specimens of *Cyaniris* in any one locality seem to become larger, more lightly marked beneath and to show a stronger tendency to paleness on the upper surface of the female as the season advances. In view of this, and of the known relationship of *C. violacea* and *C. Pseudargiolus* in W. Virginia, may it not be possible that there is but a single species of *Cyaniris* in N. America? For this, it is necessary to assume some such hypothesis as the following, which is suggested solely in the hope of stimulating investigation and arriving at perfect knowledge: That in W. Virginia the first brood of this single species appears as *violacea* with both brown and blue females; the succeeding broods as *Pseudargiolus*, with occasionally (perhaps in seasons unfavorable for the growth of the larva or its food-plant) a few individuals of smaller size (*neglecta*). That in New York and Ontario, the first brood appears as *violacea* with only blue females; and the succeeding broods as *neglecta* with occasionally a few larger specimens (*Pseudargiolus*); this being the centre of the latitudinal range of the insect, the distinction between the broods would appear less marked than elsewhere. That in New England and further north the first brood appears as *Lucia* and *violacea*—the earlier individuals of the brood *Lucia*, the later *violacea*, just as the first brood

* A species of *Cyaniris* exists in Western Texas, but I possess only females. These resemble *C. neglecta* more closely than any other of the known forms, but are much paler throughout. They were taken between the middle of September and the middle of October.

of *Ajax* is made up in W. Virginia of an earlier appearing *Walshii* and a later *Telamonides*; the subsequent broods as in New York. That in the high north there is a single brood—the spring form *Lucia* alone. That in California (until we have further knowledge) the early spring brood is absent and the summer broods are made up of *Pseudargiolus* with occasional smaller (*neglecta*) and occasional more heavily marked (*Piasus*) individuals. On this hypothesis, *Lucia* is a boreal and colline form of *violacea*, and the summer broods of the species are absent in the extreme north, or, further south, consist of larger (*Pseudargiolus*) and smaller (*neglecta*) individuals, according to conditions more or less favorable to growth.

Of course this hypothesis is based principally upon my personal knowledge of the sequence of forms in New England, and may prove altogether wrong. I believe, however, that it is worth considering. If it appear complicated, it need only be said that there is complication somewhere. And furthermore, while Mr. Edwards in W. Virginia raised *violacea* in the spring from progeny of *Pseudargiolus* which went into chrysalis the autumn previous, Mr. Abbot in Georgia years ago raised *Pseudargiolus* (or what he called *Argiolus*) in March from caterpillars which went into chrysalis the last of April of the preceding year. The spring brood, therefore, is probably made up, in the south at least, of butterflies which existed as caterpillars at various times during the whole of the previous year. This is precisely what Edwards has admirably proved of *Ajax*; and if it be a constant phenomenon in *Cyaniris*, then it is likely to be equally true at the north, and the probable occurrence of dimorphism in the first brood at the north (*Lucia-violacea*) would be similar to the same phenomenon in *Ajax* at the south (*Walshii-Telamonides*) and the two features may yet be proved to have a logical connection.

It may also be added that it is extremely uncommon for two such closely allied species as *neglecta* and *Lucia*, living in the same district, to differ as much as it has been supposed they do, in the number of their broods, *Lucia* appearing in New England but once, *neglecta* twice a year*; indeed only one instance among New England butterflies occurs to me, and that is somewhat doubtful. I refer to *Limochares Taumas* and *L. Manataqua*, the former of which is double brooded, and the latter, as far as I know, single brooded; the data, in the latter case, however, are

* The second brood appears to be invariably less abundant than the first.

but scant. Still these are butterflies which do not fly before June, while the species of *Cyaniris* appear early in the spring and thus have a much better chance to develop a second brood. Should my hypothesis of the Californian *Cyaniris* be brought against me, as presuming a double instead of a triple brood, as in Eastern America, I would reply that there is a much greater difference between monogeneutism and digenutism than between the latter and trigoneutism. It is a much more common thing for a digoneutic insect to become trigoneutic in a southern station, than for a monogeneutic to become digoneutic under those influences. Therefore, knowing that the form *neglecta* appears twice a year, it should be regarded, *a priori*, as probable that *Lucia* is succeeded by another brood (not necessarily resembling it) the same season.

As to the European *C. Argiolus*, it is double brooded, but I do not find reference to any difference between the broods.

In this paper, for readier comparison with what has been previously written, I have used the terms *Pseudargiolus*, etc., as Edwards employs them. It is plain to me, however, that the *Pseudargiolus* of Boisduval and LeConte is the form described by Edwards under the name of *violacea*, and I have so placed it in my revision of the species of this group, recently presented to the Buffalo Society of Natural Sciences.

Appendix; On the Seasons of the Species of Cyaniris in New England.

C. NEGLECTA.—Like the preceding species [i. e., *C. Pseudargiolus*] this insect is double brooded, hibernating in the chrysalis state. The earliest males appear at or shortly before the middle of May, but do not become abundant before the last week in the month; the first females appear about ten days later than the males, but are still rare at the beginning of June, although they disappear toward the end of the month or early in July. The eggs are probably laid in the middle and latter part of June and most of the caterpillars become full grown in the early part of July; how long a time is passed in the chrysalis is unknown, but the earliest butterflies of the second brood appear about the first of July and continue to emerge from the chrysalis until the first of August; they become abundant by the middle of July, although the males are often still greatly in excess in the latter half of the month, and in spite of their great delicacy these insects may still be seen in September. This brood

does not appear to be so abundant as the first ; we have no knowledge whatever of its subsequent history ; probably the eggs are laid in August and hatch at once, the caterpillars attaining their growth in the latter part of September and transforming to chrysalids before winter.

C. VIOLACEA [after quoting Mr. Edwards' statement of its seasons in W. Virginia, as given in the Butterflies of N. America, the account continues]—In the north, however, it appears and disappears much later, for it makes its advent during the first week in May, both sexes becoming abundant toward the end of the month, and it still remains upon the wing throughout June ; one specimen has been taken in Walpole, N. H. (Smith), as late as the 7th of July. Of its further history we know nothing ; probably the eggs are laid in June and the caterpillar transforms in July, the chrysalids remaining unchanged until spring.

C. LUCIA.—It is a single brooded insect and the first of our butterflies to appear fresh from the chrysalis in spring. The earliest specimens gladden our eyes about the middle of April, although often delayed a week by inclement weather ; the earliest recorded date is that of April 14 (W. Roxbury, Mass.-Faxon). It becomes abundant a week after its advent and continues so throughout the first half of May, when it begins rapidly to decrease and by the end of the month is seldom seen. In elevated and northern localities it is unquestionably later in its appearance and disappearance, since male specimens (rubbed indeed) have been taken in Williamstown, Mass., as late as the middle of June (Scudder), in the White Mts. not uncommonly up to the 17th of the month (Scudder), and occasional specimens even on the 23rd-24th (Sanborn), while in Quebec it is "very abundant at the end of May" (Bowles), and in Southern Labrador was "common from the first of June to the end of July" (Couper). In Alaska, the females taken during the first week in June (Dall) were rubbed, but this may have been due to poor collecting implements. In New England the eggs are laid towards the middle of May ; this state probably continues a week, but how soon the caterpillar becomes full grown is unknown ; it undoubtedly hibernates in the chrysalis state.

CAPTURES OF NOCTUIDÆ NEAR ORILLIA, IN THE
PROVINCE OF ONTARIO, CANADA.

BY GEO. NORMAN, CHERRY HILL, FORRES, SCOTLAND.

During the season of 1875 I collected Noctuæ near Orillia, in the Province of Ontario. The locality where I resided was the Couchiching Hotel, a place of great beauty, situated on a wooded isthmus dividing Lake Couchiching from Lake Simcoe.

From the varied nature of the ground, enormous forest tracts, swamps, etc., I fully expected the locality would have been more productive in insects than my last year's place of sojourn, St. Catharines, which was, comparatively speaking, very poor and with very little timber. In this I was much disappointed, possibly owing more to the bad season than to the locality. The season was an unusually cold one. This, combined with the high and cold winds which prevailed at nights during the whole summer, was very much against sugaring, and certainly rendered it one of the very worst collecting seasons I ever experienced.

I may here mention that Mr. F. Grant, who has resided at Orillia some years, has found *Agrotis fennica* not unfrequent on a species of *Spiræa*, visiting the flowers. He has also taken *Plusia striatella*, *M. Comstockii*, *Agrotis gilvipes*, *Adita chionanthi* and other rare Noctuæ.

In sending a list of my captures to the CANADIAN ENTOMOLOGIST, I have deemed it advisable, in order to prevent confusion, to adopt the arrangement and nomenclature of Mr. Grote's lately published "Check List." In spite of the above mentioned drawbacks, it will be seen that the locality has not failed to yield a few species new to science. These have been kindly determined and described by Mr. Grote, of Buffalo, to whom my best thanks are due. The following species may be added to my list of St. Catharines captures: *Agrotis decolor*, *Acr. vinnula*, *H. badistriga*, *P. angulata*, *A. plecta*, *T. v-brunneum*, *A. gladiaria*.

Raphia frater. July 4th; rare at light.

Momophane (Diphtera) Comstockii. (Mr. Grant).

Diphtera fallax. July 2nd; at sugar; not uncommon.

Apatela (Acronycta) occidentalis. June 7th; common at rest and sugar.

——— *morula*. July 7th; not uncommon at sugar.

- Apatela hasta*. June 20th ; rare at sugar.
- *innotata*. July 11th ; common at sugar.
- *hastulifera*. July 15th ; rare at sugar.
- *noctivaga*. June 15th ; common at sugar.
- *superans*. July 11th ; not uncommon at sugar.
- Agrotis sigmoides*. June 21st ; bred from larvæ ; afterwards frequent at sugar.
- *haruspica*. July 15th ; very common at sugar.
- *phyllophora*. July 22nd ; rare at sugar.
- *baja*. July 29th ; very common at sugar.
- *C. nigrum*. June 24th ; bred from larvæ ; very frequent at sugar.
- *bicarnea*. June 17th ; bred from larvæ ; very abundant at sugar.
- *herilis*. August 11th ; not unfrequent at light and sugar.
- *tricosa*. August 18th ; rare at light and sugar.
- *badicollis*. August 4th ; not rare at rest.
- *rubifera*, *n. s.* July 24th ; very common at sugar.
- *conflua*. August 11th ; rare at sugar.
- *Normaniana*. August 11th ; common at sugar ; much darker than St. Catharines specimens.
- *plecta*. July 16th ; not uncommon at sugar.
- *gularis*, *n. s.* August 12th ; not uncommon at flowers, sugar and light.
- *cinereomacula*, *n. s.* July ; not unfrequent at flowers.
- *turris*, *n. s.* August 20th ; not unfrequent at sugar and light.
- *friabilis*, *n. s.* August 4th ; rare at sugar.
- *versipellis*, *n. s.* June 20th ; not unfrequent at light.
- *campestris*, *n. s.* Not uncommon at light and sugar.
- *tesselata*. July 11th ; very common at sugar and light.
- *clandestina*. June 27th ; bred from larvæ ; very common at sugar.
- *alternata*. August 8th ; very common at sugar.
- *cupida*. August 25th ; very common at sugar.
- *messoria* (*Cechrani*). August 2nd ; swarming at sugar and light.
- *saucia*. July 7th ; exceedingly common at sugar.
- *suffusa*. August 12th ; very abundant at sugar.
- *venerabilis*. September 9th ; rare at light.
- *pressa* (*Aplecta*). July 5th ; common at rest and sugar.

- Agrotis occulta* (*Aplecta*) August 16th ; not rare at sugar.
- *prasina* (*Aplecta herbida*). July 8th ; very common at sugar.
- Pachnobia Orilliana*, n. s. May 13th ; not unfrequent at palms.
- Matuta Catharina*. May 10th ; not uncommon at palms and light.
- Mamestra vicina*. August 4th ; rare at rest.
- (*Aplecta*) *nimbosa*. July 14th ; not uncommon at sugar.
- (*Aplecta*) *imbrifera*. Bred from larvae often, and at sugar.
- *atlantica* = *H. suasa*? June 21st ; rare at light.
- *albifusa*. June 7th ; very common at rest.
- *claviplena*. June 2nd ; common at sugar.
- *olivacea*. August 6th ; common at rest and sugar.
- Hadena arctica*. July 9th ; very abundant at light, rest and sugar.
- *devastatrix*. July 1st ; the most abundant moth at light, rest and sugar.
- *apamiformis*. August 7th ; rare, one specimen at light.
- *sputatrix*. July 12th ; exceedingly common at sugar.
- *dubitans*. July 19th ; rare at sugar.
- *sectilis*. June 28th ; not uncommon at sugar.
- *mactata*. August 19th ; very abundant at sugar.
- *modica*. August 14th ; not uncommon at sugar.
- *fractilinea*. August 24th ; not uncommon at sugar.
- *chalcedonia*. June 14th ; not common at sugar.
- *renigera*. July ; very common at rest and light.
- Diptyrygia scabruiscula* (*Pinastri*). July 1st ; not unfrequent at sugar and rest.
- Hyppa xylinoides*. June 12th ; very common at sugar and rest.
- Actinotia* (*Cloantha*) *ramosula*. August ; one specimen at light.
- Callopietria mollissima*. August 12th ; rare ; one specimen at sugar.
- Conservula anodonta*. July 21st ; not uncommon at sugar.
- Trigonophora periculosa*. July 21st ; not rare at sugar.
- *v-brunneum*, n. s. July 24th ; not rare at sugar.
- Euplexia lucipara*. June 9th ; frequent at light and sugar.
- Brotilomia iris*. June 21st ; rare at light.
- Nephelodes violans*. August 21st ; very frequent at light, rest and sugar.
- Helotropha reniformis*. August 12th ; very abundant at sugar.
- *atra*, n. s. ? With the last, but not so frequent.
- Hydroecia nictitans*. July 17th ; very common at sugar.
- *sera*. July 15th ; common at sugar.
- Arzama obliquata*. July 14th ; rare at light.

- Heliophila pallens*. July 16th ; rare at sugar.
- *unipuncta*. June 21st ; very common at flowers and sugar.
- *pseudargyria*. July 15th ; rare at sugar.
- Laphigma frugiperda*. September 6th ; rare at sugar.
- Caradrina miranda*. August 9th ; rare at sugar.
- *multifera*. August 8th ; very abundant at sugar, light and rest.
- Pyrophila (Amphipyra) pyramidoides*. August 7th ; very abundant at sugar.
- *trogopoginis*. August 8th ; common at sugar and rest.
- Parastichtis gentilis*. July 25th ; rare at sugar.
- *perbellis*. July 18th ; rare at sugar.
- *minuscule*. September 9th ; rare at light.
- Crocigrapha Normani*. May 17th ; not uncommon at palms.
- Tenioecampa alia*. May 20th ; very rare at palms.
- *oviduca*. June 9th ; very rare at light.
- Orthodes infirma*. July 10th ; common at sugar.
- *cynica*. July 18th ; common at sugar.
- Eucirrædia pampina*. August 24th ; abundant at sugar.
- Orthosia infumata*. September 12th ; rare at sugar.
- *ferruginoides*. August 29th ; very common at sugar.
- *togata (silago)*. September 10th ; not common at rest and sugar.
- Scoliopteryx libatrix*. Very common at sugar all the season.
- Litholomia napæa, n. g. et sp.* May 11th ; rare at fallows.
- Lithophane (Xylina) petulca*. September 10th ; very abundant at sugar.
- *ferrealis*. September 2nd ; common at sugar.
- *Bethunei*. September 2nd ; swarming at sugar.
- *seminusta*. May 18th ; rare at palms. September 9th ; common at sugar.
- *Georgii, n. s.* September 5th ; not uncommon at sugar.
- *disposita*. Rare at palms in May ; abundant in Sept. at sugar.
- *cinerea*. Rare at palms in May ; September 15th, occasionally at sugar.
- *laticinerea*. September 15th ; rare at sugar.
- *oriunda*. September 8th ; rare at sugar.
- Anytus sculptus*. August 21st ; rare at sugar.
- *capax*. September 14th ; rare at sugar.
- Calocampa nupta*. May at fallows. September 11th ; common at sugar.
- *curvimacla*. May at fallows. September 14th ; not uncommon at sugar.

- Lithomia germana*. September 5th ; very abundant at sugar.
- Plusia aereoides*. August 7th ; not common at rest.
- *purpurigera*. August 1st ; at thistle blooms.
- *bimaculata*. August 28th ; rare at rest.
- *striatella*. (Mr. Grant).
- *simplex*. June 8th ; rare over flowers.
- *u-aureum*. September 9th ; rare at light.
- Pyrrhia exprimens*. August 2nd ; rare over flowers.
- Galgula hepara*. September 9th ; rare at rest.
- Eustrotia carneola*. June 12th ; common at rest and sugar.
- *nigritula*. July 9th ; not unfrequent at sugar.
- Drasteria crichto*. May 2nd ; not common.
- Parallelia bistriaria*. July 2nd ; not unfrequent at sugar.
- Catocala relictæ*. September 10th ; saw several at sugar.
- *unijuga*. August 14th ; not common at sugar.
- *Briseis*. July 21st ; common at sugar and rest.
- *parta*. August 29th ; rare at sugar.
- *ultronia*. July 27th ; common at sugar and rest.
- *concupens*. August 11th ; not common at sugar.
- *ilia*. August 12th ; rare at sugar.
- *antinympha*. (Mr. Grant).
- *cerogama*. August 11th ; very common at sugar.
- *præclara*. August 2nd ; not unfrequent at sugar.
- *fratercula*. August 18th ; rare at sugar.
- *gracilis*. August 11th ; rare at sugar.
- Homoptera calycanthata*. May 28th ; common at sugar.
- Pseudaglossa tubricalis*. One of the most abundant at sugar throughout the season.
- Epizeuxis Americanalis*. Exceedingly common at sugar.
- Xandlognathe levigata*. Rare in July.
- *ochreipennis*. Not unfrequent at sugar in July.
- Renia plenilinealis*. August 24th ; not unfrequent at sugar.
- Bleptina caradrinalis*. Not common at sugar in July.
- Bomolocha perangulalis*. July ; very abundant at sugar.
- *abalienalis*. July 20th ; common at rest and sugar.
- *Baltimoralis*. Very frequent at sugar.
- *hijugalis*. June ; not unfrequent at sugar.
- Hypena subrufalis*. August ; not unfrequent at sugar.

Hypena evanidalis. August 13th ; rare at sugar.

Platyhypena scabra. Common at sugar.

Bruphos infans. At birch trees in May (Mr. Grant).

NOTES ON CATOCALAS.

BY THE EDITOR.

For several years past we have had in our possession bred specimens of a small species of *Catocala* near *polygama*, which we have been unable to refer with certainty to that species, and yet in the imago state the differences between the two are so inconspicuous that we have felt a hesitancy in describing the one as distinct from the other. There is, however, what appears to us to be a strongly marked difference between the larvæ of the two species, and chiefly on this ground we have been induced to describe them as distinct. The larvae of both species feed on thorn.

Catocala cratægi, *n. s.* Larva. Specimens taken by bush beating about the middle of June. Length about one and a half inches, onisciform. Head flat, medium sized, slightly hairy, grayish, with a few blackish streaks and dots ; bilobed, each lobe tipped with reddish, mixed with white ; these colors margined before and behind with blackish brown, in which are dots of a paler hue ; sides of head pale greenish white, with a faint network of brownish lines.

Body above greenish ash color, with many minute dots of brownish black, some of them forming indistinct and imperfect lateral streaks ; dorsal line very slightly paler than general color. Second and terminal segments with a number of small whitish dots, each emitting a single hair. On each side of the dorsal line is a row of small tubercles, those on third segment whitish tipped with black, on fourth reddish tipped with dull white ; on the remaining segments they are a little larger and decidedly red tipped with whitish. Between each of these, and running in the same direction, is a small whitish dot or minute tubercle ; each and all of these tubercles emit a single brownish hair. The upper portion of the ninth segment is raised, and on its centre there arises a thick, fleshy horn

about one-tenth of an inch long, slightly curved backwards, of a dull dark reddish color, thickly dotted with black about the base. The usual dark patch on ninth and tenth segments is wanting, excepting close to under surface, where it is faintly visible. Twelfth segment scarcely raised, with no black streak behind, but having a faint line formed by a row of black dots extending obliquely down the sides towards the front. Terminal segment flattened; lateral fringe of a decided rosy pink hue; spiracles whitish encircled with black.

Under surface whitish green, with a tinge of blue; a central row of brownish black spots larger and deeper in color on seventh and eighth segments, decidedly paler on second, third and fourth, and of a reddish brown on segments from ninth to thirteenth inclusive. Feet pale greenish, faintly marked with brown; prolegs bluish green, hinder three pairs streaked and dotted with black.

Occasionally specimens not full grown have been met with of a darker shade, arising from their being more thickly dotted with black; in these the tubercles have been less decidedly red, while the fleshy horn approached the general color, but was thickly covered with blackish dots.

The moths produced from this larva very much resemble *polygama*, but are smaller. The brown filling of the subterminal space is obsolete or very pale; the transverse posterior line has the lower tooth very small, while the line itself is narrow; in *polygama* the teeth are sub-equal; the sub-costal angulation of the line is also less pronounced and the sub-reniform is connected with and very near the transverse posterior line. In 25 specimens of *polygama* the sub-reniform is connected with the transverse posterior line only in a single specimen. The transverse posterior line between the lower discal tooth and vein 2, where it joins the sub-reniform, is more directly oblique and even; in *polygama* this line, though sometimes uneven, seems to form a regular curve. The transverse anterior line appears to be more regularly arcuate. The hind wings and under surface are almost identical with *polygama*. From both sexes carefully examined we are unable to give any further points of difference.

We would here remark that in six additional specimens of *polygama* the lower tooth of the t. p. line is smaller than the upper. Possibly none of the points of difference urged are in themselves invariable, nor perhaps such as would suggest the separation of the species; at the same time, it is possible that some essential differences may have escaped our

observation. The differences in the larva, to be presently referred to, will, we think, excuse us for regarding the species, at least for the present, as distinct. All the specimens referred to, including an example of the larva preserved in alcohol, have been submitted to Mr. Grote, who thinks the species are probably distinct.

Larva of *Catocala polygama* found feeding on thorn about the middle of June. Length about one and three-quarter inches. Head flat, sprinkled with fine brownish hairs; bilobed, each lobe tipped with whitish; color ashy grey with a wide black band above extending obliquely down the sides, in which are several dull faint reddish streaks.

Body above greenish grey, dotted with very minute blackish dots; on the anterior portion of second and third segments there are a few whitish dots, each emitting a single hair; a broken dorsal stripe of a paler hue imperfectly margined with black, the stripe becoming whiter on hinder portion of fifth, sixth, seventh, eighth and tenth segments. On fifth and sixth segments are two whitish patches similar in form, almost pointed anteriorly, posteriorly enlarging with the hinder edge concave, thus giving the widened portion a bilobed appearance; posterior portion of fifth segment rather darker than general color, with a slight purplish tint; hinder portion of ninth segment *slightly* raised and of a deeper color, the dark patch covering the anterior portion of tenth segment and extending down the sides close to under surface. Posterior portion of twelfth segment slightly raised and margined behind with black, the same color extending obliquely down the sides towards the front. On each segment there is a small tubercle on each side the dorsal line, of a greyish hue, but so small as to be scarcely visible, excepting those on twelfth segment, which are somewhat larger. Terminal segment flattened and spreading, with a few whitish dots on its hinder portion and two reddish brown tubercles on anterior portion. Lateral fringe close to under surface of a delicate pinkish tint; spiracles blackish.

Under surface whitish green with a tinge of blue, with a central row of blackish spots larger and deeper in color along the middle, smaller and paler towards each end. Feet and prolegs greenish, dotted and streaked with brown or brownish black.

Var. A.—Rather paler in color, dark patch on ninth and tenth segments and whitish patches on fifth and sixth segments less prominent, dark patch on fifth segment almost wanting; small tubercles on each side the dorsal line more apparent; spiracles brownish, faintly edged with white.

Var. B.—General color with a stronger tinge of green, and an indistinct pale irregular stripe on each side (this character is also faintly visible in specimens of Var. A); whitish patches on fifth and sixth segments faint; small tubercles same as in Var. A.

Var. C.—Much paler in color than either of the other varieties, with the body of a decidedly greenish tint. Dorsal stripe very faint; light patches on fifth and sixth segments scarcely visible; small tubercles on each side the dorsal line blackish or brownish black, and in consequence of the paleness of general color, appear more prominent; dark patch on fifth segment wanting, that on ninth and tenth segments present, but rather paler than in the other varieties; lateral fringe very pale, with a slight pinkish tint. Spiracles dark, faintly encircled with whitish.

In all these varieties the markings on the head are constant in the two species; the peculiar shaped patches on fifth and sixth segments in *polygama* are constant, but vary in distinctness. The small dorsal tubercles in *cratægi* are always more or less red, but the most prominent and valuable point of distinction is to be found on the ninth segment, which in *polygama* is never more than a slightly raised fold, while in *cratægi* it is invariably a distinct thick fleshy horn, about uniform in size. This one character will enable any collector instantly to separate the larvæ of the two species.

NOTES ON LEPIDOPTERA.

BY C. P. WHITNEY, MILFORD, N. H.

Thyreus Abbottii. Larva.

The larva of *Thyreus Abbottii* possesses a peculiar interest to the Entomologist, as it is the only species of which the sex is supposed to be indicated by the coloration. Frequent reference to this is found in works of different authors, and nowhere have I seen any doubt expressed about the validity of the distinguishing markings between ♂ and ♀ (*vide* Harris' Ent. Correspondence, p. 284; N. Y. State Museum Report, p. 114; CAN. ENTOMOLOGIST, 1874, p. 146).

In the season of 1873 I received from a friend eight of the supposed ♀ larvæ fully grown, taken on Sweetwater Grape. As I previously had reason to doubt the correctness of the theory that all with the uniform brown mottling were of one sex, I watched with considerable interest the next year's development.

May 16th, there appeared in the breeding box one ♂, one ♀ imagines; the 18th, another ♂ emerged, and the next day another ♀.

Being absent for some time afterward, I made no note of the remainder of the brood, nor do I now recollect if any more were disclosed.

None of these larvæ had any appearance of the green markings, nor have I ever seen any captured here which had, but have seen such in Massachusetts and New Jersey.

Lerema Loammi, nov. sp.

♂. Expands $1\frac{1}{16}$ in. Wings above dark glossy brown, darker basally. Ciliæ light brown, with a blackish line at extreme base. Primaries with a subcostal transverse row of quadrate whitish spots, situate one in each of the three terminal subcostal interspaces near its base; the upper one one-half its length nearer apex. A larger sub-quadrate spot crossing second median interspace at one-third the distance from its base. An obsolescent transverse line in lower median interspace, equidistant between its base and spot in second interspace. A narrow black sexual bar broken by first median nervule; the upper portion straight, commencing at second divarication of median nervure and crossing the interspace to first median nervule near its source. The lower portion of the bar commences below the nervule about its own width removed outwardly, is strongly concave within, and reaches submedian nervure about two-fifths its distance from base. Secondaries immaculate.

Beneath dark chestnut brown. Apex of primaries and border of secondaries with a bloom of pearly scales. Primaries with upper markings repeated and two minute dots in subcosto-median interspace, resting one on each nervule; one in first median interspace and a transverse line in third. These five (including one in second interspace repeated above) are in a line from apex to middle of internal margin.

Secondaries with a curved sub-basal row of three small irregular white spots. The first is in the costo-subcostal interspace one-fourth the distance from its base; the second in the subcosto-median interspace, and

the third on the submedian nervure. A subterminal sinuate row ; the first double, situate in the costo-subcostal interspace midway between its other spot and its extremity. A black streak running from this spot sharply outward to next spot in subcosto-median interspace, which is followed in the succeeding interspaces by five more small transverse spots. All the spots of secondaries with a black border.

♀. Expands $1\frac{1}{2}$ in. General coloration a little lighter than in the male. Primaries above with two spots at extremity of disc. An irregular transverse band commencing with three subcostal spots, the upper one not removed outwardly as in the male ; the fourth twice its own width nearer margin ; the fifth in a line with first three ; the sixth twice its width nearer base ; the seventh largest, removed its width internally ; the eighth double or with upper half obsolete. Lower surface of primaries with upper markings repeated. Secondaries with basal row inconstant. First three spots of subterminal row running toward outward margin ; the others running at a right angle from third, toward inner margin. In one ♀ the subterminal row of secondaries is indicated above by a few lighter scales. 1 ♂, 3 ♀, Jacksonville, Fla. March 22nd, 23rd, 1875.

ON PLATYSAMIA COLUMBIA SMITH.

BY F. B. CAULFEILD, MONTREAL, P. Q.

In No. 4, Vol. ii, of the "Bulletin of the Buffalo Society of Natural Sciences," Dr. H. A. Hagen gives an interesting paper on this moth and its parasites.

After a brief review of the previous literature of the species, Dr. Hagen says : " If *columbia* should happen not to be a distinct species, it must be either a variety of some other species or a hybrid of two species." As regards its being a variety of *cecropia*, Dr. Hagen says that he has examined large numbers of *cecropia*, but never saw a variety agreeing with *columbia* ; one small and dark colored male he indeed at first thought was an intermediate form, but on comparing it carefully he found it to be *cecropia*, though a somewhat remarkable variety ; he therefore comes to the conclusion that *columbia* is not a variety of *cecropia*.

My own experience exactly corresponds with this. I have seen many specimens of *cecropia*, both large and small, light and dark, but nothing that would form a connecting link between the two insects. As regards the second eventuality, a hybrid form, Dr. Hagen says that he "believes it possible that *columbia* may be a hybrid, perhaps of *cecropia* and *promethea*; in favor of its being a hybrid would be the circumstance that such a large species should occur so rarely, while the large number of Lepidopterologists eager to secure this treasure operates against the idea of its being overlooked."

Columbia certainly is very rare, as yet having only been recorded from three localities, Norway, Maine, and Quebec and Montreal, Canada. However, between Maine and Quebec, and Quebec and Montreal, are doubtless many places as yet but little known to Entomologists, where *columbia* may at some future day be found in comparative abundance.

Dr. Hagen says: "The conjecture that *columbia* is a hybrid would not be worth mentioning, if there did not exist similar cases recorded by the most prominent authorities. Of course I speak only of cases of hybrids as imagos or caterpillars, from which imagos, when bred, have been collected in the open fields. The facts just at hand (I have no doubt that more are published) record caterpillars of hybrids of *Saturnia carпинi* and *spini*, found in Austria, according to Lederer; caterpillars of *Sphinx epilobii*, a hybrid of *S. vespertilio* and *euphorbiae*, being found in France, according to Rambur; in the same country are found also caterpillars of *Sph. vespertilioides*, the hybrid of *S. vespertilio* and *S. hippophaes*, according to Boisduval and Lederer. The imagos and caterpillars of *Sph. phileuphorbia*, hybrids of *Sph. euphorbia* and *galii*, have been found near Berlin in several specimens. Hybrids of *Zygaena trifolii* and *filipendulae* were found in the imago state in England; hybrids of *Colias edusa* and *hyale*, of *Lycæna adonis* and *alexis*, of *Hipparchia arcania* and *hero*, of *Cænonympha pamphilus* and *iphis*, of *Vanessa urticae* and *atalanta*, are recorded from different countries."

This is an interesting list of hybrids taken at large, and proves (if proof were wanting) that hybrids occur amongst the Lepidoptera, but as there is only one *Saturnian* mentioned, I do not think it gives much support to Dr. Hagen's conjecture regarding *columbia*. I am of opinion that hybrids found at large must have arisen from chance encounters of the species that produced them, and therefore are to be looked for in families whose habits would be likely to bring them together, and in fact, with one exception, such is the case with the hybrids mentioned by Dr.

Hagen. The Sphinges proper (there is no *Smerinthus* mentioned) all frequent flowers. My friend, Mr. Hibbins, has taken in this locality (Montreal), at a cluster of lilac bushes, during one evening's twilight, examples of *Deilephila chamænerii*, *Sphinx chersis*, *Sph. drupiferarum* and *Sph. kalmia*. Mr. J. A. Lintner, speaking of the Noctuid *Cucullia intermedia*, says he has observed them at lilac blossoms associated with *Deilephila chamænerii*, *Amphion nessus*, *Thyreus Abbottii* and *Sesia thysbe*. Many other instances might be cited, but the fact is well known to all collectors that numbers of the Sphingidæ are constantly meeting while in search of food. This is also the case with the Zyganians, at least with the species mentioned by Dr. Hagen, as they not only frequent flowers but actually sleep on them. Edward Newman, in his Natural History of British Moths, says of *Zygana minos*: "In some favored spots every daisy will have its tenant, and as many as eight or nine are sometimes seen clustered on a single flower of the dandelion." Of course the same rule applies to the Diurnals; I have myself taken in one afternoon, between the hours of two and four, at a patch of wild asters, examples of *Grapta comma* (both forms), *G. faunus*, *G. progne*, *Pyrameis cardui*, *P. huntera* and *P. atalanta*, and once took *faunus*, *comma* and *cardui* with one sweep of the net, so closely were they associated.

With the Saturnidæ, however, the direct opposite is the case; not taking food, they do not visit flowers, being solely occupied in providing for the continuance of their species, the female waiting for the attendance of the male.

Mr. L. Trouvelot, who has bred thousands of *Telea polyphemus*, gives a very full account of its habits in Vol. 1, *American Naturalist*. Speaking of the freshly emerged insect, he says: "The moth remains quiet all day and sometimes all night, and the following day, if the night be cold; but if it be warm and pleasant, at dusk, or about eight o'clock, a trembling of the wings is observed, and then it takes its flight, making three or four circles in the air. The male flies only a few minutes, and then rests for two or three hours in the same place. The female continues to fly about the bushes, and though a virgin, she lays eggs, which are, however, of no use for the propagation of the species; she continues doing so for two or three hours, and then rests all night attached to some plant, probably waiting for her mate. Soon after the female has laid these useless eggs the males become very active and fly in search of the female, whom they soon discover, especially if there is a slight breeze and the air is loaded with vapors."

If other proof were wanting, this, I think, shows pretty clearly that the female moth gives forth some attraction by which her presence is made known to the male, and I think there must be something peculiar to the female of each species which affects the males of that species only, and by which they are directed to their proper mate, otherwise all would be confusion and there would be no such thing as distinction of species.

Sembling is a method of taking the males of Bombycidæ known and practised by most Entomologists. Are there any instances on record of the female of one species having attracted the male of another ?

In the CANADIAN ENTOMOLOGIST, vol. iv, p. 138, Mr. R. V. Rogers, of Kingston, Ont., states that a young female *cecropia* was confined in a box and exposed on a verandah. The first night five male *cecropias* were taken, on the second ten and on the third eight, while in the morning the remains of five others were found, which he supposed had been killed by cats. He also informs us that several specimens of *Telea polyphemus* were taken in the same manner. In the CAN. ENT., vol. v, p. 139, the Rev. C. J. S. Bethune states that on the 19th of June, 1873, he exposed a young female *cecropia* for several nights without success, the evenings being cool. On the 28th, the evening being warm and misty, six male *cecropias* were taken, and as the female had been so long in confinement the experiment was discontinued. Mr. Bethune also tells us that he tried the experiment with a female *promethea*, but as the cocoon had been brought from a distance, no males were attracted.

Dr. Hagen says : "There is perhaps another circumstance in favor of my conjecture. The hybrids of *Tetreo cerogallus* and *tetrix*, known as *Tetreo intermedia*, occur notoriously always when by excessive hunting the males of the first are killed in such a number that the females are obliged to recur to the males of the other species. Now it is not improbable that in times when some species of *Attacus* are extensively damaged by parasites, the interbreeding would be much facilitated."

(To be Continued.)



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NOTES ON ENTOMOLOGICAL NOMENCLATURE.

Part II.

BY W. H. EDWARDS.

In 1806, Hübner, as we have seen, printed for his own use and in order that it might be submitted to certain competent persons, to be examined and judged of, the sketch of a plan for the arrangement of the Lepidoptera, called the Tentamen, &c.; and this sketch "was afterwards enlarged and published as the Verzeichniss bekannter Schmetterlinge," as stated by Geyer, Thon's Archiv., vol. 1, p. 28, 1827. What the Tentamen is I have shown in a previous paper, CAN. ENT, vol. viii, Feb'y No., and have given reasons for denying its authority in nomenclature. I will now proceed to show the character of the Verzeichniss and to examine its claims in the same direction.

The Verzeichniss bekannter Schmetterlinge, a Catalogue of Known Butterflies, by Jacob Hübner, Augsburg, 1816, pp. 431, follows the general plan of the Tentamen. The Lepidoptera are divided into several *Phalanxes*, of which the first is called *Papiliones*, the second *Sphinges*, the third *Bombyces*, &c.

The *Papiliones* are divided into two *Tribes*, called *nymphales* and *gentiles*.

The *nymphales* into 9 *Stirps*, the *gentiles* into 6, and each *Stirps* into many *families*, so that in all there are 62 *families* among the Butterflies; and each *family* is divided into small batches called *coitus* and altogether there are 309 *coitus* of Butterflies.

The *Stirps* are briefly and unevenly defined by characters drawn from the mouth, the "snout" (proboscis), the "ears" (antennæ), the body and wings, and partly from the colors of the wings.

The 1st *Stirps* of the *nymphales*, called Nereides, is thus defined: "Antennæ thin, but thickened like a club at the end, fore wings narrow

and long, hind wings broad and long, fore legs pretty long, the legs and feet beset with a pair of light spines at the end of the feet; the thighs pretty spiny; the abdomen very thin, but thickened towards the end." This Stirps embraces what modern authors call the Heliconidæ, and others.

The 2nd Stirps, Limnades, thus: "Antennæ pretty long and knobbed; both wings broad and pretty long; the fore legs short, almost smooth, the legs and feet at their ends beset with a pair of slight spines; the thighs rough, the claws long and almost straight; the abdomen long and thicker towards the end." Embraces the Danaidæ and others.

The remaining Stirps of the *nymphales* are more briefly defined. The 3rd, Napacæ, thus: "The antennæ long, the fore legs pretty hairy upon the langern (a word to be found in no dictionary), and the abdomen short." Partly covering the Lemoniadæ of modern authors.

The 4th Stirps, Lemoniades, thus: "The wings tolerably common-formed (fast gemeinformig), the abdomen moderately stout and long." Comprises in part Lemoniadæ, Acreidæ, Nymphalidæ (Melitaea).

The 5th Stirps, Dryades, thus: "The antennæ very short knobbed. The wings spotted above with black on an ochre-yellow ground, below pale and marbled." Embraces one section of the Melitaeas, viz., Phyciodes and the Argynnidæ.

The 6th Stirps, Hamadryades, thus: "The wings angular, the lower ones having a sheath in which the body rests." Comprises Vanessidae, Elymniadæ, &c.

The 7th Stirps, Najades, thus: "Antennæ tolerably club-shaped; the wings above dusky, below bright colored, every where spot banded." Limenitis, Ageronia and others of the Nymphalidæ.

The 8th Stirps, Potamides, thus: "Body pretty thick, antennæ club-shaped, the wings strong and considerable." Mainly the Morphidae.

The 9th Stirps, Oreades, thus: "The palpi pretty roughly haired; the antennae delicately bent down at the end and club-shaped; the wings with eye like spots, white pupilled; the legs very weak." Embraces the Satyridæ and others.

Of the *gentiles*, the 1st Stirps, Agrodiaeti, is thus defined: "The palpi naked at the ends; the cheeks white margined; the antennae tolerably short, long-knobbed; the legs, especially the fore legs, short." Includes the Lycaenidæ.

The 2nd Stirps, Archontes, thus : " The palpi entirely hairy ; the antennae clubbed, bent ; the wings large ; the fore legs much like the others, but spineless and the abdomen free." Comprises the Papilios and Parnassians.

The 3rd Stirps, Andropoda, thus : " All the members pretty badly shaped (ziemlich schlechtformig), the wings pale colored and black." Part of the Pieridae.

The 4th Stirps, Hypati, thus : " Palpi large, directed forward, the antennae club-shaped, the wings angled and jagged." The Libytheidae.

The 5th Stirps, Telchinae, includes heterocerous moths, and I omit it.

The 6th Stirps, Astyci, thus : " The forehead broad, the palpi thickly haired ; short-snouted ; the antennae beset with a little lock on their knoblets, hooked at the end ; the wings pretty broad, moderately large." The Hesperidae.*

Now it strikes me that nothing more is needed than to give these definitions in full to show that they are almost if not wholly worthless. If in the 1st and 2nd Stirps of the *nymphales*, and the 2nd and 6th of the *gentiles*, there is a somewhat full definition, embracing the antennae, palpi, legs and shape of the wings, in the remainder there is a singular indefiniteness and hesitancy. In some the wings are not mentioned at all (Napaeæ, Agrodiaeti), in others the members are not (Hamadryades, Lemoniades), in others still the antennae alone are coupled with the

* NOTE.—The language used by Hubner throughout this volume is uncouth and that of an unlettered man, a condition not at all incompatible with skill in delineating and coloring. Consequently, while his plates are models of excellence, his text is boorish. To him, fore wings are pinions, schwingen ; hind wings sinkers, senken ; the fore legs arms, aerme ; the antennae ears, ohren ; the proboscis a two snouted nose, zweischnaubigen nase, &c. One of the coitus of the Astyci is thus characterized : " The wings spotted with white like a sausage," which is Hubnerian for mottled. Dr. Hagen, to whom I applied for light respecting certain words, writes thus : " Hubner was illiterate. His language cannot be called in any sense plain German. He invented a number of words for things and parts for which words existed long ago in German, and were used and adopted fifty or even a hundred years before Hubner. Apparently he had no knowledge of these words or of the works in which they were used. The consequence is that neither science nor even any popular writer has adopted Hubner's words. They are known to nobody, and for some of them the sense can only be guessed. You will find them in no German dictionary. They are simply self-made barbarisms." Geyer, Thon's Archiv., 1827, in his notice of Hubner and his works, calls his language " illiterate (schwunglose sprache), greatly marred by self-made words."

coloration, not shape, of the wings, and in three especially (Dryades, Najades and Andropoda), the coloration seems to be the essential part of the definition.

Who can possibly know from the definition what is embraced in Napaeae, or in Dryades, or Hamadryades, or Potamides, or Najades, or Andropoda ! or in Lemoniades, "the wings tolerably common formed, the abdomen stout and long." What idea does that language convey? Andropoda, "all the members pretty badly shaped," applied to the beautiful Coliades and Teriades ! It is the merest rubbish and does not deserve one moment's toleration. Moreover, these divisions accord with no modern system whatever. All through the Verzeichniss, we find that the members of distinct Stirps are ranged by Kirby (whose General Catalogue, 1871, is the latest work of classification of the Rhopalocera, and the one which for convenience I shall mainly use for comparison) in the same sub-family and even the same genus, while, on the other hand, the Hübnerian Stirps, families and coitus dissolve into distinct and unrelated sub-families and genera in Kirby. For example, Melitaea (species Phaeton, Cinxia, &c.) stands in Hübner among the Lemoniades, whose wings are "tolerably common formed," but Phyciodes (species Tharos, &c.), which is closely allied to Melitaea, and has by nearly all authors been considered as but a group under that genus, is put in another Stirps, Najades, where the wings must be intolerably common formed, or tolerably uncommon formed, I do not know which, by the side of the Argynnides. The Vannessidæ go in still another Stirps, and Limenitis in a fourth, and all these and others stand in Kirby in the single sub-family Nymphalinæ. So far as appears, Hübner regarded the barriers which separate these Stirps as substantial as those between any of the series—the Papilios (Archontes) from the Pierides (Andropoda), for instance. As to the species brought within the several Stirps, every lepidopterist knows that a very large proportion of the Butterflies naturally fall into groups so distinct that the veriest tyro in collecting can scarcely make a blunder in assorting his specimens. And what the tyro sees Hübner could not well help seeing, but the moment there was doubt he was completely at fault, and as a consequence several of his Stirps have no foundation in nature and his definitions of them from necessity are as vague and misty as are those of his families and coitus.

The family divisions are made up almost wholly from coloration, and a large part of the names chosen for them are simply puerile, as voracia, fugacia, sapientes, adolescentes, armati, festivæ, etc. And in assorting

the species all the ring-streaked go in one family, all the speckled in another. Thus 1st Stirps, Nereides, 1st family, Vitriæ, "both wings centrally transparent ;" 2nd family, Fulvæ, "the wings rust-yellow, spotted with black and sulphur yellow." And as might be expected, both the families and the coitus under them being assorted by mere coloration, with the Stirps characters so insignificant, the results are often surprising. Thus Stirps Limnades, 2nd family Ferrugineæ, "all wings black margined and white dotted," contains species of Danaidae, our *D. Archippus* (called *Anosia Menippa*) being one. But the same definition applies equally well to our *Limenitis Disippus* (called by Hübner *Anosia Archippus*), and here of course it is among the Danaidae, though its natural allies are in a remote Stirps, the Najades. But the Najades are defined as "dusky above, bright colored below, every where spot-banded," and *Disippus* under this sort of classification has no place there. As to the characters derived from the members, they form no obstacle at all to the shifting of a species from one Stirps to another. Nereides has the antennæ "thickened like a club at the end"; Najades has them "tolerably club shaped." And so *Disippus* may range under either Stirps with this limp style of characterization. Another of these Anosians is *Misippus* Linn., put by Kirby in *Hypolimnas* Hüb., among the Nymphalinae near *Limenitis*, and *Hypolimnas* is also one of the coitus of Najades, defined "the fore wings white spotted, the hind pale banded"! Such instances occur repeatedly, as will hereafter appear, and that not merely between the Stirps of the same Tribe even. Nor need it be deemed strange that in many cases Heterocerous Moths overstep the Phalanx and find their places among the Butterflies.

The value of the family names is so uncertain that authors who reverence the Stirps and coitus names have in a great degree, and, in fact, except in two or three instances, altogether ignored them. And yet if Mr. Scudder's Canon 1 were to have the force of law, each of these 62 family names would have to have place made for it, and be a permanent addition to the nomenclature.

All these divisions, Stirps, families and coitus, are built on the same plan, and are subject to like defects. The family is a magnified coitus, and the Stirps bears the same relation to the family. Some of each may have their equivalents in modern classification, but it is accidental, and the greater part have none. Even were the Stirps homogenous, they could not run with modern families or sub-families. They are both too great and too small. Nor could the families, on same condition, run with

modern sub-families or with genera. They are of less value than the one and either greater or less than the other. So the coitus are also both greater and less than genera ; often they are plainly nothing but groups or sub-genera, but as often they embrace a heterogenous collection to which no appellation can be given. They are constructed in defiance of any generic principle, whether it be community of descent or structural resemblance. They are precisely what the name *coitus* indicates, an assemblage, a batch, a lot of things brought together, and in this case the tie is not relationship, but a superficial resemblance in which relationship has no part, and by which all natural grouping is violated, and members of distinct genera, of distinct sub-families and families are brought together because they happen to be red or yellow or blue. Hübner struck out a new path for himself, and instead of adopting the systems sanctioned by the usage of his day, or the characters on which such systems were based, he fixed upon the single item of coloration as the unit of his arrangement. This runs from coitus to Stirps and vitiates the whole. As I have said elsewhere, it is exactly as a child would sort his alleys and taws, or as if, according to the illustration of Dr. Boisduval, applied to this very book, a botanist should found his classification upon the colors of the flowers, or the marbling or pinking of the leaves. Or it is as if a zoologist were to sort the mammals by coloration, and put in one genus a black cat, black fox, black wolf, black bear, in another a gray cat, gray fox, gray wolf and a badger; or as if an ornithologist would couple a blue jay and a blue crane, a gold finch and a yellow parrot. It is impossible, therefore, that these coitus can be ranged with genera. They are something essentially different, crude creations of an unscientific mind,* and any attempt to utilize them is like forcing curved lines to lie parallel with straight.

* What good result was possible when such an author attempted to classify all the species of the several divisions of the great order Lepidoptera, never having seen more than a small fraction of the insects themselves and knowing nothing of the remainder except through loose descriptions and from plates like those of Herbst and Esper and Cramer, in which the superficies only is represented and that coarsely and with no heed to exactness. Many of the figures on these plates cannot even now be identified, and are believed to represent insects which have no existence in nature, perhaps manufactured articles sold to confiding collectors by cunning dealers. Treitschke intimates that the dealers palmed on the author of the Verzeichniss varieties for species, and common exotics as rare indigenous. Hubner's contemporaries understood his capabilities and were fully equal to judging correctly his system, and accordingly the Verzeichniss was quietly ignored, and except through his plates, this author exercised no influence on that generation.

The sooner and more completely this difference between a coitus and a genus is recognised, the better for the nomenclature of the lepidoptera. *And coitus not being genera, and having no equivalent in the nomenclature of the science, the laws regulating the standing of genera have no application to the coitus whatever.*

In the Butterflies of the Verzeichniss are 309 coitus, out of which Mr. Scudder in the Hist. Sketch has "reinstated" 283, as good and proper names of genera, entitled by what he terms "the inexorable laws of priority" to place, whether there be room for them at the feast or not.*

We have seen how Stirps are defined and families. Let us look at the coitus. Beginning at the 1st Stirps, Nereides, 1st family.

- | | | | |
|-------------|------------|------------|--------------|
| 1st coitus, | Hymenitis. | Fore wings | half-banded. |
| 2nd " | Ithomia. | " " | once " |
| 3rd " | Oleria. | " " | twice " |
| 4th " | Thyridia. | Both wings | banded. |

2nd family, 2nd coitus, Dismorphia, "fore wings small, hind wings large, particolored." And being of that shape and particolored, the species under this coitus, which really are Pierids, and whose natural allies are in the Stirps Andropoda, in the other Tribe *gentiles*, must rank with the Heliconidæ, ten Stirps away. And why? *Because a Pieris as one of the Andropoda has no business to be particolored, that Stirps permitting only those species which are pale colored and black!*

Take Archontes (Papilios), 1st family, 2nd coitus Jasonidae, "hind wings tolerably long and tolerably short-tailed."

3rd coitus, Euphœades, "both wings tolerably broad, brown colored and yellow-spotted." Now one of these definitions is in no way incompatible with the other. Though the wings of Jasonides may be tolerably long, that does not hinder them from being tolerably broad also, and though Euphœades is brown-colored, for aught that appears, Jasonides

* The laws of priority are not inexorable, and such laws anywhere lead only to absurdity and injustice. The author of the Hist. Sketch nowhere hesitates to decide what names of genera are entitled to credit and what are not, and rejects such as he pleases with no regard to the "inexorable" laws. In the Rules of the Brit. Ass'n, the 11th Rule says, "a name may be changed when it implies a false proposition," &c., the systematist of course being judge. And in the notes on this, Prof. Verrill says, "it wou'd be well to exclude all names that refer to abnormal structures," &c. Usage condemns profane and blackguard names. The laws of priority, like all human laws, are to be applied with a few grains of common sense; that is all.

may be brown also. Under the former of these stands our Papilio Turnus, and under the latter the black female of same, or Glaucus. Not a particle of difference between a yellow female Turnus and this black Glaucus, except in the one item of color. But to suit the Hübnerian system the two must lie in distinct coitus ! No better illustration of the nature and value of a coitus could be brought forward. It is black cat, black fox, versus gray cat, gray fox. *Are these two coitus genera or sub-genera, or are they groups ! They are neither, but something radically different, and which has no equivalent in modern systems and cannot be expressed.* I happen to have an example of female Turnus, called an hermaphrodite, one side of the wings and body of which is yellow, the other black, and which therefore belongs equally to two coitus ! The yellow half is Jasonides, the black Euphœades. Does my example therefore belong to two genera !

Mr. A. R. Wallace, President of the Entomological Society, London, in his Anniversary Address of 22nd Jan'y, 1872, Trans. Ent. Soc., uses this language : "We find Hübner's condemnation in almost every page of Kirby, in the utter want of agreement between his groups and modern genera. The modern restricted genus *Heliconius* contains species belonging to seven Hübnerian genera" (coitus), etc. . . . while in other cases the species comprising Hübner's groups are divided amongst several quite unrelated genera."

An impression prevails in some quarters that, although the coitus are often composed of heterogeneous materials, yet there are many exceptions, and in such cases, while the former should be rejected, the latter might properly be regarded as natural groups, and accepted as true genera, their names taking precedence accordingly. Mr. Kirby, in his paper on the Necessity of a Reform in the Generic Nomenclature of the Diurnal Lepidoptera, so speaks : "As Hübner relied almost exclusively on *facies*, his genera are both too numerous and too heterogeneous. His genera are usually treated as manuscript" (that is, as entitled to no authority on account of some intrinsic defect, as want of suitable definition, for example), "but unjustly as I now think, though I formerly expressed a different opinion ; for on closely examining the work, *many of his genera will be found to be natural.*" And Dr. A. Speyer, in his paper on Eur.-Amer. Verwandtschaften, Stett. Ent. Zeit., 1875, says : *Only those of Hübner's coitus are to be regarded as scientifically established which are either sufficiently characterized, or in which the satisfactory characterization is at least replaced by the fact that the species of the special genus*

are all brought together under the same generic name without heterogeneous intermixture."

To determine whether homogeneous groups were the rule or the exception, I made an analysis of the Verzeichniss from the beginning as far as the Astyci (Hesperiidae), looking out every species and noting its place in Kirby, and this is the result. There is occasionally a coitus co-extensive with the limits of a modern genus, but in all cases solely by reason of some strong peculiarity of color or shape; as *Chrysophanus*, which includes the coppers, and is equivalent to Doubleday's genus of same name. But out of 255 coitus preceding the Hesperiidae there are but 35 such, and of these, 13 have but one species each, 6 have two and 6 have three; *so that 25 of the 35 coitus contain but 3 species or less.* Many other coitus are homogeneous, but of this class the species under two, three or several are lumped together by Kirby in one genus, *so that such coitus are plainly regarded as equivalent to something less than genera, and the remaining coitus, 106 of the 255, are made up of species assigned by Kirby not only to distinct genera, but of sub-families and families.* For example, 1st Stirps, 2nd family, 4th coitus, *Eueides*, under which stand 7 species. In Kirby 1 goes to *Eueides* Hüb., 2 to *Lycorea* Doub., 2 to *Melineae* Hüb., and 1 to *Tithorea* Doub.

Or 5th coitus, *Melineae*, 5 species, 1 to same, Hüb., 3 to *Heliconius* Latr., 1 to *Tithorea* Doub.

Or 3rd family, 1st coitus, 10 species, 2 to *Eueides* Hüb., and 8 to *Heliconius* Latr.

And so *Heliconius* picks species at random from the 2nd family, 3rd and 5th coitus, and from 3rd family, 1st, 2nd, 3rd and 4th coitus, and from 4th family, 1st and 2nd coitus. And *Eueides* from 2nd family 4th coitus, 3rd family 1st coitus.

Or 2nd Stirps, *Limnades*, which comprises the *Danaidae*, 3rd family, 4th coitus *Didonis*, 2 species only, one of which stands in Kirby as *Didonis* Hüb., the 56th genus of the 8th sub-family *Nymphalinae*, the other as *Elymnias* Hüb., 1st genus of 3rd sub-family *Elymninae*. Now the coitus *Elymnias* stands in the 6th Stirps, *Hamadryades*, 4th family 5th coitus, *directly among the Vanessans, the species Antiopa being in the coitus next preceding, and Prorsa in the one next following!*

Under the head of *Euploea* stand 7 species, 6 of which are put by Kirby into *Danais* Latr. and one in *Hypolimnias* Hüb., and by a curious swap, the species which Hübner put into three other coitus are lumped

in one genus called Euploea Hüb. ! And besides that the true Euploeas are put to Danais Latr., most of the species belonging to the coitus Hestia and Anosia are also put to Danais Latr., though they stand in two different families. And one of these Anosians, is a Limenitis (Disippus) as before related, while another is a Hypolimnas.

Third Stirps Napaea, 1st family, 2nd coitus Hamanumidae, 6 species' 3 put by Kirby under same name, Hub., and this genus stands in the 1st family, 8th sub-family Nymphalinae, and 87th genus of same ; of the rest, 1 is Aterica Bois., the 88th genus, 1 is Zemeris Bois., of the 2nd family, 2nd sub-family Nemeobiinae, and 1 is Charis Hüb., which stands in the 2nd family, 4th sub-family, Lemoniinae. Now the coitus Charis is one of the Napaea, as well as the coitus Hamanumidae, which last, as we see, has so gotten among the Nymphalinae ; and under Charis are two species only, Gyas and Anius. Kirby puts Gyas into Anteros Hüb., among the Lemoniinae, but looking up Anteros in the Verzeichniss, I find it a coitus of the Stirps Agrodiaeti, or Theclinae ; that is, in the other Tribe, *gentiles*, 7 Stirps away from the coitus Charis ! That is the sort of wild goose chase one has between these two volumes.

Same Stirps Napaea, 1st coitus Thysonotis, 2 species, 1 put by Kirby in Cupido Schrank, in the Lycaenidae, that is, according to Hübner, in the Stirps Agrodiaeti, the other in Dynamine Hüb., the 43rd genus of the Nymphalinae. Turning to Dynamine in the Verz., we find it among the Najades, 7th Stirps, thus defined : "the wings white banded below, the hind wings marked by two eye like spots." But Thysonotis was defined : "*both wings colored only at the margins, centrally white.*"

Fourth Stirps, Lemoniades, 1st family, 3rd coitus, Actinote, 4 species, 3 of which go to Acrea Fab., among the Nymphalinae, 1 to Alesa West., in the Lemoniinae.

Second family 1st coitus Melitaea, 6 species, among them Phaeton and Cinxia, all put by Kirby under Melitaea Fab., as are likewise the species of 2nd coitus. Then comes 3rd family, 1st coitus, Byblia, 1 species, put in Hypanis Bois., a genus of Nymphalinae beyond Melitaea in Kirby, by the breadth of all the Vanessidae, and the very next coitus, Cinclidia, has all its species put in Melitaea again.

Fifth Stirps, Dryades, 1st family, Reticulatae, "wings above striped like a grating, the hind wings below with colored spots on a pale yellow ground and marked by eye like spots." 1st coitus, Phyciodes, "both wings above with a band of spots, under side very delicately marked," 2

species only, one of which is our *Tharos*, and as these species of *Phyciodes* form a section of the natural group *Melitaea*, it is worthy of notice how Hübner's system compels him to put them into a separate *Stirps*. The 2nd coitus, same family, is *Brenthis*, "the hind wings below gayly clouded, pale spotted," and here come 5 species, 4 of which are put by Kirby to *Argynnis* Fab., while the 5th is *Euptoieta Claudia*, stuck in here because its hind wings are gayly clouded.

Next comes the 2nd family, 1st coitus, *Argynnis*, 10 species, all of which are put to *Argynnis* Fab. Then 2nd coitus, 3 species, of which 1 is *Argynnis* Fab., 1 *Atella* Doub., 1 *Lachenoptera* Doub. The 3rd and 4th coitus have all their species put to *Argynnis* Fab. The 5th, *Colænis*, 4 species, 2 of which stand as *Colænis* Hüb., 1st genus of the *Nymphalinae*, *Argynnis* being the 12th, and 2 as *Eueides* Hüb., amongst the *Heliconidae*. Definition of *Eueides*: "the fore wings twice spot-banded, the spots all yellow"; of *Colænis*: "wings striped, nearly plain beneath, the hind wings marked at base with white."!

The 6th coitus has 6 species, 1 put to *Messara* Doub., 1 to *Atella* Doub., 1 to *Pseudacrea* West.. 61 genera ahead of *Argynnis*, and 3 go to *Argynnis*. So that *Argynnis* Fab. picks species from several coitus, situated in two families, among which are *Heliconidae*, *Melitaeas* and many distant genera.

The 6th *Stirps*, *Hamadryades*, consists of a mixed lot of species, many quite unrelated, and classed by Kirby in several distinct sub-families of the *Nymphalidae*, namely, in the 2nd, 3rd and 8th. In this last division are the *Vanessans*, a compact tribe naturally well characterized. The 1st coitus, 1st family, is *Vanessa*, comprising 3 species, *Cardui*, *Huntera* and *Carye*, and the coitus is defined: "wings above marbled, below with large peacock eyes." The next coitus is *Pyrameis*, 2 species, *Atalanta* and *Callirhoe*, defined: "wings red-banded above, marked like a peacock's tail below." These 5 congeneric species belong to 2 coitus, because 3 are marbled and 2 are red banded! By Kirby all these are classed under *Pyrameis* Hübner, regardless of the coitus character, which excludes everything that is not red-banded. By Scudder, (Revision, etc.) all are placed under *Vanessa* of Fab., *not of Hüb.*, which is right. Now where are the rest of the *Vanessans*, *C Album*, *Antiopa*, *Io*, etc., in the *Verzeichniss*? Naturally they should at least stand by the side of *Cardui* and *Atalanta*. Instead of that they are 3 families away, being in 4th family, 2nd, 3rd and 4th coitus, under the names *Polygonia*, *Eugonia* and

Inachia. Then comes the 5th coitus, *Elymnias*, placed by Kirby in his 3rd sub-family (the *Vanessans* being in the 8th) and next follow more *Vanessans*, viz., *Araschnia Prorsa*. And between *Pyrameis* and *Polygonia* stand *Precis*, *Anartia*, *Temenes* (which includes a *Satyrid*), *Junonia*, *Apatura*, *Historides* (which last is composed of the species *Orion* and *Marchesius*, totally out of place here, and put by Kirby in the 98th and 111th genera, 8th sub-family, *Vanessa* being 22nd). That is, according to Hubner's notions, *all these intervening species were nearer Cardui and Atalanta than were C album and Polychloros and Antiopa*. *Polygonia* embraces 4 species, among which are *C Album* and *Progne*. One of the rest, *C Aureum* Linn., under its other name, *Angelica* Cramer, is also a member of the next coitus, *Eugonia*, classed with *Polychloros* and *Antiopa*, as much at home in one coitus as the other, and a 2nd species of *Eugonia*, *Polynice*, is placed by Kirby in *Rhinopalpa* Feld.

The coitus *Apatura* is quite another thing from *Apatura* Fab., the genus recognized by Kirby and all authors, Hubner having had the habit of appropriating names right and left from any author accessible,* and with no credit, using them in altogether other senses than the original. Under it stand 12 species, 6 of which are put by Kirby in *Precis* Hub., 24th genus of *Nymphalinae*, 1 in *Cymothoe* Hub., the 89th, 1 in *Siderone*, the 111th. But the name *Cymothoe* is not in this *Stirps Hamadryades*, being borrowed from 7th *Stirps Najades*. It must be borne in mind that in every case where a species is taken from one coitus and credited to a genus named from another coitus, violence is done to Hubner's arrangement, and his system, even while made use of, openly condemned.

The 7th *Stirps*, *Najades*, comprises another lot even more mixed than the 6th. The 1st family, 2nd coitus, is *Callianira*, 1 species only, *Ephestion* Stoll. (our species *Ursula*), put by Kirby in *Limenitis* Fab., with the European species *Sibilla* and *Camilla*, which in the *Verz.* stand in coitus *Limenitis*, separated from the other by 4 families and 20 coitus! And in these 20 coitus are species belonging to all sorts of unrelated genera, *Ageronia*, *Phyciodes*, *Colaenis*, *Siderone*, etc., etc., *all nearer to Ursula, from the Hübnerian point of view, than Sibilla was*. Why? Because *Ephestion* is "dusky below, banded and spotted with yellow," while *Sibilla* is "blackish brown, pale banded below, partly blue, the

* Thus the coitus *Hesperia* is one of the *Napacae*, as is also coitus *Lycaena*. Hubner proceeded in all respects as if he were the first and only systematist who had treated of the *Lepidoptera*.

bands *almost* broken into spots." And far away, in the 2nd Stirps, Limnades, is a third species of this genus Limenitis, namely, Disippus, because its wings are "black margined and white dotted." Here are three congeneric species, differently colored, and therefore placed in three widely separated coitus, and one of them in a distant Stirps! It seems odd, yet it is perfectly right under this alley and taw system. The only wonder is that men of scientific training can soberly call these coitus genera, or that two Hubnerians can look each other in the face without laughter.

Second family, 5th coitus Symphædra, 4 species, 2 put to same, Hub., 1 put to Athalia Hub., and 1 to Aterica Bois. To make up Aterica species are taken from 1st family 1st coitus, 2nd family 5th coitus, 3rd family 1st coitus.

Third family 2nd coitus, 3 species, 1 to Callizona Doub., the 51st genus of Nymphalinae, 1 to Gynæcia Doub., the 52nd, and 1 to Nymphalis Latr., the 104th genus.

Fifth coitus, 3 species, 1 to Catonephele Hub., 40th genus Nymph., 1 to Euphaedra Hub., the 85th, 1 to Siderone Hub., the 111th genus.

Fourth family 2nd coitus, 2 species, 1 to Phyciodes Hub., the 14th genus Nymph., 1 to Villa Kirby, the 57th.

Fourth coitus, 3 species, 1 to Colænis Hub., the 1st genus Nymph., 2 to Victorina Blanch., the 64th.

Fifth family 1st coitus, 4 species, 1 to 1st genus Nymph., 1 to 58th, 1 to 81st, 1 to 82nd.

Second coitus Acca, 13 species, of which 7 go to Neptis Fab., the 81st of Nymph., 3 to 82nd, 1 to Eurytela Bois., the 30th, 1 to Phyciodes Hub., the 14th. So that we see Phyciodes picking species from

5th Stirps,	1st family,	1st coitus.
7th "	4th "	2nd "
" "	5th "	" "

And Eurytela from

6th Stirps,	1st family,	1st coitus.
7th "	5th "	2nd "

Eighth Stirps Potamides, 1st family 2nd coitus, 2 species, 1 to Doleschalla Felder., the 28th genus Nymph., 1 to Siderone, the 111th. And Siderone picks from

6th Stirps,	3rd family,	1st coitus.
7th "	" "	5th "
8th "	2nd "	2nd "

And *Morpho* Fab. as it stands in Kirby picks from 3rd family 1st, 4th and 6th coitus, while between the 2nd and 4th comes *Bia*, one of the *Satyrinae* !

Ninth *Stirps*, *Oreades*, generally equivalent to what in Kirby is the 2nd sub-family of the *Nymphalidae*, the *Satyrinae*. 1st coitus *Tenaris*, 2 species, put under *Tenaris* Hub., which stands in the 4th sub-family of the *Nymphalidae*, the *Morphinae*.

Third family 1st coitus, *Faunis*, 2 species, 1 to *Cleome* West., among the *Morphinae*, the other to *Taygetes* Hub., the 57th genus of the *Satyrinae*. The very next coitus, *Lethe*, 1 species, put in *Lethe* Hub., the 7th genus of the *Satyrinae*. And the coitus immediately following is *Hypna*, 1 species, put as *Hypna* Hub., the 109th genus of the *Nymphalinae* !

Fourth family, 1st coitus *Hipparchia*, 7 species. 6 of which are put to *Hipparchia* Fab., the 32nd genus of *Satyr.*, 1 to *Calisto* Hub., the 46th.

Third coitus *Eumenis*, 4 species, 2 to *Hipparchia* Fab., 2 to *Oeneis* Hub. The next coitus, *Oeneis*, has 5 species, 4 put to same and 1 to *Hipparchia* Fab.

This spurious genus, *Oeneis* Hub., thus made up by selecting from two coitus, each of which contains a mixed lot of *Chionobas* and *Hipparchia*, is quoted now-a-days as the equivalent of the well defined and natural genus *Chionobas* Boisduval, with a pretended precedence of some 30 years !

Hipparchia Fab. selects species from the 4th family, 1st, 2nd, 3rd, 4th coitus, and 5th family 7th coitus.

Ninth family, 1st coitus *Callidula*, 3 species, 1 doubtfully put to *Pentila* West., a genus of the *Lycaeninae*, 1 to *Haematera* Doub., the 48th genus of *Nymphalinae*, and 1 is a *Heterocerous* Moth. Scudder (Hist. Sketch) says that 2 of the 3 are Moths.

Second coitus, 3 species, 1 to *Crenis* Bois., 35th of *Nymph.*, 1 to *Callithea* Bois., 56th of same, and 1 to *Trichoris* Hew., the 39th genus of the *Lycaeninae*. Now *Oreades* is claimed by the Hubnerians to be synonymous with *Satyridae* !

Under *Maniola* Schrank, Kirby lumps all the species of two families and eight coitus, except two species.

Second Tribe *gentiles*, 1st *Stirps*, *Agrodiaeti*. The 1st family has 11 coitus, every species except one under which is lumped in Kirby as *Cupido* Schrank, as are others in the next family and several coitus.

ON PLATYSAMIA COLUMBIA SMITH.

BY F. B. CAULFEILD, MONTREAL, P. Q.

(Concluded from April No.)

Taking into consideration the great difference in the lives and habits of the orders in question, I do not think the interbreeding of species of the genus *Tetreao* is any strong proof of the correctness of Dr. Hagen's conjecture. Robert Mudie, in his "Feathered Tribes of the British Islands," speaking of *Tetreao tetrix*, says: "During the latter part of autumn and winter the males live together in flocks and in a state of the most perfect harmony; but when the warmth of spring begins to be felt, and their plumage, which had become rather dull during the winter, begins to shine in all the beauty of its glosses, they separate from each other and fight stoutly for their females. They are then on the alert by early dawn, crowing and showing off the beauties of their plumage in a great variety of attitudes and gestures."

This, I think, is a great contrast to the life of the moth. The Grouse is gifted with the power of uttering cries or calls by which his presence is made known, not only to his own species, but to *every bird that is within hearing*. Of this the moth is entirely destitute; further, when the call of the male Grouse has attracted the female, he makes his desires known to her by various gestures and attitudes, and any person who has given a little attention to domestic fowls or to pigeons, must be aware that birds can convey a great deal of meaning by gesture. This power, too, is wanting in the moth. Now, supposing that the males of one species of *Tetreao* were absent, and the males of another were calling, the females of the first species would hear them and their natural instinct would, I think, teach them to go to a cry that must at least bear a family resemblance to that of their proper mates; once in sight of the male his animated gestures would convey his desires, and though they might not actually keep in his pack, yet from their social habits they would keep near them, and seeing the gestures of the male, would sometimes submit to him in the absence of their legitimate partners.

But with the moth it is very different; in this case the attracting power emanates from the female, and is silent and invisible. The moth utters no cry by which her presence would be made known to the males

of other species, her attractive power, as shown I think by the experiments quoted, affecting the males of her own species only. Therefore I cannot see how the scarcity of any species of Atticii would be the means of producing hybrids; surely the absence of the males of one species would not increase the attractive powers of the female to such an extent as to affect the males of another species; if so, why did not the female *promethea* exposed by Mr. Bethune attract some of the male *cecropias* that came so freely to their own female.

There is another point to be considered in this comparison of birds and moths. During the breeding season a pack of Grouse consists of one male and several females, therefore if half of the pack were killed by hunting, the male would in all probability be amongst them. But in the moths the sexes are, I believe, nearly equal, and even if a species was extensively damaged by parasites, we have no reason for thinking that both sexes would not be represented by the few that escaped the attacks of their enemies, in which case there would be no need of their recurring to another species.

Dr. Hagen says that in the year that *columbia* was taken in Maine, the Atticii were extensively attacked by parasites in that neighborhood. In this locality (Montreal) in 1874, the year that Mr. Pearson found *columbia*, the Atticii were remarkably free from parasites; I do not think there was more than one in eight affected. Mr. Pearson found five cocoons of *promethea* (it is always rare here), four of which produced the moth; the other was dead in the chrysalis, but had not been attacked by parasites. Mr. Pearson also found twelve cocoons of *cecropia* on one tree, all of which produced the moth, and from a large number of cocoons of *cecropia* and *polyphemus*, taken in various places around Montreal, the number affected by parasites was comparatively small.

I suppose the reason that *cecropia* and *promethea* are selected as the parents of *columbia* is that the dark color of the latter bears a slight resemblance to the smoky color of the male *promethea*, but how is it that there is no trace of the falcate primaries of that insect in either sex of *columbia*, and how is it that in *columbia* there is no trace of the very remarkable manner in which the cocoon of *promethea* is attached to its food plant?

Dr. Hagen mentions several instances of hybrids having occurred amongst the Atticii while in confinement. I do not think much importance should be attached to this circumstance, as the interbreeding of

insects while in confinement is no proof that they will do so under natural conditions. Doubtless many of the *Atticii* will interbreed if shut up together, but from the stay-at-home habits of the females, I think they are about the least likely of all Lepidoptera to do so while in a state of nature.

But leaving theories and conjectures, let us see what evidence known facts will give us in favor of *columbia* being a good species. In (I believe) 1862 or 1863, Prof. S. J. Smith found a number of cocoons of *columbia*, three of which produced the moth. In August, 1864, Mr. G. J. Bowles found at Quebec a larva which in due time spun its cocoon. This cocoon was at first of a whitish color, but turned to a dark brown, and was then similar to the other cocoons of *columbia*. Mr. Bowles tells us that the moth died in the chrysalis state, owing perhaps to the presence of parasites. In speaking of this larva, Mr. Bowles says: "The principal difference (as far as I can remember), was in the number of red warts with which the larva was ornamented, *columbia* possessing more than the other species" (*cecropia*). Dr. Hagen examined the dried larva skin of *columbia* (taken in Maine), and found the number of warts to be the same as *cecropia*, but the difference pointed out by Mr. Bowles was not in the total number of warts, but in the number of red ones, that is, the larva of *columbia* had more red warts than the larva of *cecropia* has.

In 1866, Mr. Bowles found another cocoon attached to a twig of thorn, but it was full of parasites, dead in the pupa. In the fall of 1867, Mr. Wm. Couper informed Mr. Bowles that he had seen a Saturnian larva spinning up on a gate-post. Mr. Bowles found this cocoon, which in the following May produced a female *columbia*.

In the winter of 1874, the Messrs. Pearson found a cocoon on a maple tree, in this city (Montreal), which next season produced a male *columbia*.

In Norway and Maine I believe both *cecropia* and *promethea* occur; certainly both these species occur in this locality (Montreal), but neither *cecropia* nor *promethea* have been recorded from Quebec. Now, Messrs. Couper and Bowles collected for a number of years at Quebec, but never met with either of these species; surely it is hardly possible that two experienced collectors would find a hybrid in the same locality, and neither of them find the species that produced it. Nor is it likely that a hybrid would occur in the same locality in such closely succeeding years as *columbia* did at Quebec, in 1864, 1866 and 1867. This, I think, is very

strong evidence, indeed, and weighing carefully all the facts of the case, the appearance of the moth and its cocoon, and the habits and instincts of the order and family to which it belongs, we are, I think, until further and more direct evidence to the contrary is produced, fully justified in considering *columbia* to be a distinct species.

NEW PYRALIDS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Botis sexmaculalis, n. s.

♂ ♀. This species in ornamentation approaches *partialis* Led., Taf. 9, fig. 8. Both wings clear pale lemon yellow. Primaries crossed by four equidistant lines, of which the first three from the base form brown spots narrowly outlined in black on the costal region. The third spot coalesces with an inferior spot on the line. The second line widens into a small spot on internal margin. The fourth line has a small dark spot on costa and one on internal margin. The apical half of the fringes are dark brown. The secondaries show a distinct discal point, another at anal angle and another at the extremity of vein 2, the most prominent of a line of minute terminal marks. Head and thorax yellow, collar brown; abdomen yellowish; legs yellow, spotted with dark. No. 239, Prof. F. H. Snow, Lawrence, Kansas; Expanse 18 to 20 mil.

Botis penitalis, n. s.

♂ ♀. This species in size approaches *crinitalis* Led., Taf. 12, fig. 2. The color is a yellowish ferruginous, more or less bright. Subterminal line indicated by a darker shading. Outer line dentate, slightly inflected on vein 2, linear, distinct and tolerably regular. Discal spots undefined, darker shaded marks, the orbicular small. Interior line upright, thrice waved. Secondaries pale or stramineous, pellucid, slightly ferruginous stained along external margin, with pale fringes and a faint transverse line visible medially. Beneath yellowish, the outer line visible distinctly on

primaries, and the subterminal showing as a dark discontinued shade band. The dentate line on secondaries continuous. Expanse 29 mil. No. 285, Lawrence, Kansas, Prof. Snow. "Common; feeds upon the "receptacle" of the Western Water-lily (*Nelubium luteum*)."

Botis erectalis, n. s.

♀. This species resembles the preceding, but is a little larger. The color is a dusty wood brown. The exterior line has the dentations rounded at their points and the line itself differs by being less erect, more outwardly produced opposite the cell and followed by a narrow pale shading. It runs more inwardly at external margin and seems to be without the sinus on vein 2. The stigmata are small, dark, solid, less diffuse and more distinct than in *penitalis*. The hind wings are pale, dusted with fuscous with a median line visible centrally, a narrow terminal line and the terminal space more distinctly fuscous; beneath with a distinct discal mark. Fore wings fuscous, showing the markings of upper surface, the small reniform lunule and orbicular dot, evident. Expanse 34 mil. Albany, Prof. Lintner, No. 1,310.

Botis communis, n. s.

♂ ♀. This small species appears to be allied to the group of *ventralis*, but the venter is not discolorous. It varies from fuscous to orange yellow. Outer line finely denticulate, followed by a paler shade, upright, indented submedially thence perpendicularly to internal margin. Stigmata dark, small, solid, distinct. Hind wings pellucid; beneath paler than above. The secondaries vary to fuscous; the median line sometimes noticeable, beneath it can be made out as well as a discal spot. Expands 20 mil. New York (E. L. Graef, No. 144) to Alabama (Grote).

ON COPIIDRYAS GLOVERI (*G.* & *R.*)

BY A. R. GROTE, BUFFALO, N. Y.

My kind correspondent, Mr. O. Meske, of Albany, sends me a male specimen presumably belonging to this species, which we referred originally to the Cuban genus *Euscirrhopterus* Grote, and (from a female)

considered congeneric with *E. Poeyi* Grote. The specimen now sent has an undivided frenulum and is unquestionably a male. It does not show, however, the aberrant wing structure of *Euscirrhopterus*. It might be referred to *Eudryas* but for the peculiar frontal structure. Instead of a tubercle, a wide plate extends forwards from the clypeus, with a lip-shaped outer margin, which is peculiar. I therefore make it the type of the genus *Copidryas*. The thorax is hairy, grayish black; two white lines run from the palpal tips above the eyes to the base of the head. The ordinary lines are expressed by metallic scales, and the black edged sub-equal stigmata are filled with similar scales. The female type of the species is not accessible to me and its description varies, as above noted, from my present male. It was, I recollect, not in very good condition; and it has been figured by Glover (Plate 85, fig. 34). From this figure my male differs by the absence of the shallow white median sinus, and white internal annuli to the stigmata, as well as by the narrow black band on the hind wings (even on its inner edge), and less brownish, more grayish black primaries; the orbicular is also more elongate. The yellow abdomen is black at anus and tufted with black scales at base. There is besides a mesial line of black scales on the dorsum. The eyes are naked. On the whole, I am inclined to consider this form as the ♂ of *C. Gloveri*; more material of both sexes and a comparison with the type are needed to make the matter certain. It is not unreasonable to expect some sexual differences, in coloring at least, in this group.

LARVÆ OF *THYREUS ABBOTII*.—In response to Mr. Whitney's article with regard to the supposed sexual distinction in color of the larvæ of this species (CAN. ENT., 8, 75), I can confirm it from my observations made in breeding larvæ of both colors in Brooklyn, L. I. I have never regarded the color as a sexual character and in my Sphingidæ of Cuba (Proc. Ent. Soc. Phil., 1865) I state distinctly that "the larvæ of *Thyreus Abbotii* and certain species of the genus *Philampelus* Harris, possess a tint of brown or green *indifferently* at maturity." I give the same fact with regard to *Eacles*. I regret that I cannot now refer more particularly to observations which were fresh in my mind when I made the above quoted statement.—A. R. GROTE.

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No. 6

NOTES ON THE VARIATION IN COLOR OF *ŒDIPODA* *CORALLIPES* AND *ŒDIPODA* *CINCTA*.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Rev. Cyrus Thomas, in his *Acrididæ* of North America, page 132, says: "There are no permanent characters by which to distinguish alcoholic specimens of *Œdipoda corallipes*, *Haldemanii*, *paradoxa* and *rugosa* from each other." He therefore considers them the same. Probably *Œ. discoidea* might be considered as another variety of the same. This much named grasshopper is abundant in Nebraska from the middle of June to about the middle of August. Owing to its large size (which is exceeded here only by the huge, wingless *B. magnus*) and colored wings it is one of the most conspicuous of our Orthoptera. It would be difficult, if not impossible, to breed grasshoppers from the egg; the only way, therefore, to establish the relationship of different varieties, is by comparing a large number of fresh specimens, seconded by close observation of their habits. I have therefore collected and compared a large number of specimens of this species during the past summer. I find but little difference between them except in the color of the wings and hind femora and tibiæ; but these vary considerably, as the following table will show:

- Variety A. Wings yellow; inside of hind femora and hind tibiæ yellow.
- " B. Wings red; inside of hind femora and hind tibiæ yellow
(*Œ. paradoxa*).
- " C. Wings yellow; inside of hind femora and hind tibiæ bright
red (*Œ. Haldemanii*).
- " D. Wings red; inside of hind femora and hind tibiæ bright red.
- " E. Wings yellow; inside of hind femora whitish, ribs brown;
hind tibiæ yellow.
- " F. Wings yellow; inside of hind femora brown, lower sulcus
blue; hind tibiæ yellow.

Variety G. Wings red ; inside of hind femora brown, lower sulcus green ; hind tibiae yellowish red.

“ H. Wings red ; inside of hind femora greenish blue ; hind tibiae yellow (*Æ. discoidea*).

Variety “ D ” I have frequently seen mated, but never with any other variety. This, then, may prove a distinct species, which point another season's observation may determine. The other varieties mate indiscriminately and assume the imago form at the same time. Probably a close search would reveal other varieties not enumerated above.

A similar instance of variation in color is afforded by another Nebraska species, viz., *Ædipoda cincta* Thos.

This species appeared sparingly last August. Its season was of short duration. It is of medium size and has spotted elytra similar to *Æ. corallipes*. In Mr. Thomas' description of the ♀ the wings are said to be “transparent, base greenish yellow, a narrow fuliginous band across the middle, apex pellucid with a few fuscous dots.” This description applies very well to perhaps half the ♀ specimens obtained here ; although the band can hardly be called “narrow” as compared with our other *Ædipodas*. But specimens with the base of the wings *red* were quite as frequently seen, both males and females. The two varieties appeared at the same time, were found in company and disappeared together. Other than the color of the wings, there is no perceptible difference between them. The ♂, not described by Mr. Thomas, is smaller and darker than the ♀. It has several large fuscous spots at tip of wings ; the inside of hind femora and hind tibiae are of a more brilliant blue, and the whole upper side of the abdomen has, in life, the same beautiful color.

The species, as taken here, differs in several particulars from Mr. Thomas' description of *cincta*, but is said by that gentleman to be identical.

The red winged var. may therefore be known as *Ædipoda cincta* var. *umbrator*. The measurements of both varieties are as follows :

Female—Length, 1.25 inches ; elytra, 1.20 inches ; hind femora, .65 in.

Male—Length, .95 inches ; elytra, .90 inches ; hind femora, .55 inches.

From the above notes it will be seen that color can not always be depended upon as a specific character in our *Ædipodini*. Undoubtedly the present number of supposed species could be greatly reduced by careful comparisons instituted on the field of collection.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

ADELA.

A. (Nematais?) trifasciella, ♂. *N. sp.*

Eyes large and close together on the vertex. Palpi, base of tongue and large basal joint of the antennæ, head and upper surface of the thorax, clothed with long blackish hairs, darker than the fore wings are, except at their base. The antennæ are more than twice the length of the wings and silvery white, the basal third dotted above with blackish. Wings and legs rich dark brown, changing with the light to green, blue, violet, bronze and golden. At about the basal fourth of the fore wings is a narrow white fascia, about or just behind the middle is another slightly angulated posteriorly; these two fasciæ are a little nearer together on the costal than on the dorsal margin, the first one being a little oblique, and before the apex is another costal streak perpendicular to the margin, and nearly opposite, but a little behind it, is a small dorsal white streak. Probably these two streaks are sometimes united; and the first two fasciæ are much less distinct in the middle than on the margins, and are possibly sometimes interrupted. The tarsi are grayish fuscous, annulate with white at the joints. *Al. ex.* $\frac{1}{2}$ inch. Received from Mr. James Behrens, of San Francisco, California.

A. fasciella, ♀. *N. sp.*

The white streaks and fasciæ on the wings resemble those of the preceding species, except that they are wider and more distinct. The middle one is not angulated, the first one *appears* to be a dorsal streak not crossing the wing, but this appearance may be the effect of slight denudation of the base of the dorsal margin; and the third streak stops abruptly close to the dorsal margin, is not interrupted and is not nearer to the apex on the dorsal than on the costal margin. All this, however, is within the ordinary range of variation within the limits of a species, and this *may* be the female of the preceding species. But the head and appendages are clothed with saffron hairs, instead of blackish, and the hairs are shorter. The antennæ are broken off, except the basal half of one, which has alternate black and white joints at the base, becoming black simply flecked

with white further on ; the basal joint is not swollen and the stalk is simple ; the color of the thorax and fore wings is as in the preceding species, but the reflections are more green and blue ; the hind wings are dark fuscous, *with a small white spot* about midway of the dorsal margin. The abdomen is narrow and pointed and of a rich brown hue. *Al. ex.* $\frac{1}{2}$ inch. Mr. Behrens, San Francisco.

A. flammeusella, ♀. *N. sp.*

A single specimen with both antennæ broken off near the base. The basal joint of the antennæ is not incisorate, and my notes made when the specimen was received say that the antennæ are black annulate with white. The palpi also are gone. The head is clothed with saffron yellow hairs as in the preceding species, and the body, the basal joints of the legs and the fore wings are rich greenish brown, varying with the light to purple, bronzy green or golden ; by gas light it appears bright golden and with the wings closed looks like a minute brilliant flame, whence the specific name. The fore wings have no markings except a minute whitish spot at the beginning of the costal ciliæ, which is also visible on the under side of the wing. It is a little smaller than either of the two preceding species, and like them was received from Mr. Behrens.

SEMELE.

S. argentinotella. *N. sp.*

Face and palpi pale stramineous, except the outer surface of the second joint of the palpi, which is black. Vertex, upper surface of the thorax and base of the wings of a rich black, the black of the base of the wings passing back along the fold and about the middle of the wing length, spreading gradually over the entire wing, but becoming more brownish and strongly bronzed. The costal and dorsal parts of the wing, where the black is confined mainly to the fold, are suffused with silvery white on a brown ground, which it almost obscures, and the white scales pass backwards into the bronzed brown parts of the wing behind the middle ; and there is also a patch of suffused white at the base of the dorsal ciliae before the apex ; the bronzed brown becomes deeper from the middle of the wing length backwards, and the apex is nearly black. There are two silvery spots at the end of the cell and six silvery costal streaks, or more properly, seven, but the first is on the extreme costa and seems to form part of the suffused white of that part of the wing ; the

next is short and very oblique, and a little before the middle; and each of the succeeding five is a little less oblique and a little larger, the last pointing obliquely forwards: there is a streak at the apex (or exceedingly close to it on the dorsal margin), and there are six dorsal silvery streaks, the first five pointing a little obliquely backwards, and the sixth opposite and perpendicular to the last costal streak. The first and second dorsal streaks are opposite, respectively, to the spaces between the second and third, and third and fourth costal streaks (counting seven costal streaks in all); the third and fourth dorsal streaks are closer together, and are both opposite the space between the fourth and fifth costal streaks, and the fifth dorsal is opposite the end of the fifth costal. The dorsal ciliae are whitish with two dark brown hinder marginal lines behind the tip of the wing, the first about the middle and the other near the end of the ciliae. All of the silvery streaks are very smooth and a little raised. The antennae are black except at the base beneath and the apical fifth of their length, which are creamy white. Hind wings and abdomen (except its under surface) purplish fuscous; under surface and anal tuft creamy white. The basal joints of the legs are also yellowish white; but the tibiae and tarsi are black on their anterior surfaces, and annulate with creamy white. *Al. ex.* $1\frac{1}{8}$ inch. Kentucky in June.

S. argentistrigella.

Tinea argentistrigella, ante v. 5, p. 89.

This species structurally and in ornamentation resembles the one above described. The head is not roughened as in *Tinea*, the long scales of the vertex project forwards rather than upwards and those of the face project upwards to meet them. I have not examined the neurulation of *S. bifasciella*, but that species differs from these two by having distinct tufts on the wings and the maxillary palpi folded more like those of *Tinea*. The labial palpi of these three species and the clothing of the head, form and size of the antennae and probably the neurulation of the wings are alike, and they are nearer my genus *Pityo* than to *Tinea*.

TINEA.

T. imitatorella. *N. sp.*

At page 85, vol. 5 of the CAN. ENT., I have described a species as *T. comitariella* (there misprinted *cunitariella*). It is not necessary to describe this species (*imitatorella*) otherwise than by a reference to the

description there given. It is proper to say, however, that the palpi and legs should rather be described as silvery gray, or as gray, with blackish markings on the legs, rather than as silvery white stained with fuscous. Captured specimens of *imitatorella* were for a long time placed among *cæmitariella*, though a close examination would have shown the difference. I did not, however, observe the difference until I bred from a new larval case a species which I recognized at first as *T. cæmitariella*. On examination of the specimen and comparison with bred specimens of *cæmitariella*—a single specimen of each—a difference was found in the costal and dorsal streaks on the wings, but an examination of other specimens showed that this could not be relied on, as both species vary greatly in this respect, as these markings vary from lines which cross the wings to mere dots on the margin. The legs of *imitatorella* are more decidedly black than in the other species, but the only important difference in the imago is in the antennæ. The antennæ of *cæmitariella* are robust and yellow banded above with fuscous lines, while those of *imitatorella* are quite slender and in color shining black. There is also a decided difference in the larval cases; that of *cæmitariella* is much depressed, narrowing before each end, that is, scalloped on each side before each end, the under side truncated at each end and the upper projecting like the bowl of a spoon beyond it; the case of *imitatorella* is scarcely at all depressed, it is not scalloped as in *cæmitariella*, the upper side does not project beyond the lower, and the anterior end is narrower than the posterior one.

T. croceoverticella. *N. sp.*

Dark brown, in some lights strongly bronzed; head saffron colored; antennæ dark brown; palpi a little paler than the head; under surface silvery whitish faintly tinged with golden yellow; wings rather wide; ciliae grayish, with two brown hinder marginal lines, one at their base and the other beyond their middle. *Al. ex.* a little over $\frac{1}{4}$ inch. Kentucky.

T. thoracestrigella. *N. sp.*

Much like the above, but larger, having an *al. ex.* of more than $\frac{3}{8}$ of an inch. The fore wings are simply dark brown, without bronzy reflections; and so are the ciliae, which show no hinder marginal line; the hind wings also are brown, though paler than the fore wings. The head is more reddish saffron, and a line of that color extends from the head to the tip of the thorax. Otherwise it resembles the species above described.

ON HOMOPTERA AND ALLIED FORMS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The species of *Homoptera* stand in need of a revision. They are usually but partially and confusedly named in such collections as I have had access to. With regard to the generic title, its acceptance is only provisional. Two species, *Phaeocyma lunifera* Hübn. and *Phaeocyma fluctuans* Hübn., are unknown to me. The descriptions hitherto published in this genus are difficult to use for identification; no comparative characters are given, no analysis of the lines entered upon. The characters separating *Zale* and *Ypsia* are in great part unexplained, and of the latter dependant on larval characters. *Obliqua*, *duplicata* and *benesignata* are allied, the two first perhaps synonymous; *nigricans* is unknown to me; probably no one has yet correctly identified *calycanthata* of Abbot & Smith. Walker's and Bethune's "*calycanthata*" is *Zale horrida* Hübn. Guenee's *calycanthata* I think I have identified. *Minerea* I think I know. Walker's *herminioides* is *Epizeuxis aemula*! Leaving Walker's names out of the question, we have *lunata*, *edusa* and *Saundersii* generally fixed in collections; besides this, I have *calycanthata* Guen. and *albofasciata* Beth. determined. *Atritincta* and *edusina* are small dark forms from Texas. The present paper calls attention to the want of information and is written in the hope that material will come in so that the species may be worked over. It is necessary in studying the species to observe the course of the thread-like transverse posterior (t. p.) line. In *lunata* it is waved; in its course superiorly, opposite the cell, it will be seen to be dentate in addition to the usual central indentation. It is also dentate in *Saundersii* and *edusa*. *Rosæ* Behr., from California, from a single specimen, does not seem to me distinct from *lunata*. Drury's fig. (pl. 20) is hardly well enough drawn to decide, but the t. p. line appears to be given as somewhat jagged, so I do not venture to alter our usual determination of his species, which is our dark brown and stouter form. Another species, which I propose to consider as *minerea*, is similar to *lunata*, but differs by this line, frequently obliterate, being nearly even except the discal notch; it is a little waved inferiorly, but is not dentate superiorly. *Minerea* is of

the same facies and color as *lunata*, and is not to be confounded with more grayish or blackish forms which have this line distinct and even. It has the same subterminal dark shades as *lunata*; and the discal lunule (reniform) black and large. From time to time I have suspected in it *minerea*, and smaller specimens as *lunifera*, but it can not be the latter. It is very common in Canada and often goes under the name *lunata*. In pale specimens the median space and terminal, above the inferior black shade, are concolorous, yellow brown, and the dark markings contrast. The subterminal black lunate shade is diffuse and broader than in *lunata*. Beneath the hollow reniform is more evident than in *lunata*; I do not think there is a character in the lines of the under surface; in 10 *lunata* (Texas to Canada) these are variable. On the submedian space the t. p. line shows a slight notch or dot or thickening in *lunata*, wanting in *minerea*. *Minerea* is thinner bodied, and, perhaps, less compact and slighter winged than *lunata*. Else the two are nearly alike.

Saundersii is very like *lunata*, but has narrow whitish shades following the t. a. and subterminal lines; also on costa after the t. p. line. *Calycanthata* Guen. differs from *edusa* in the evenness of the t. p. line and richer color. *Albofasciata* differs by having a narrow white filling beyond the s. t. line. The two following forms seem to be undescribed.

Homoptera unilineata, n. s.

♂. This species is of the size of *Zale horrida*. It is totally pale brown, with all the lines indistinct except the subterminal. The wings are crossed by nebulous striæ of a darker hue. The orbicular is a black point. Reniform not legible on either surface. Subterminal line *continuous, even*, medially produced, geminate, its outer line bright ochre brown, space between its component lines pale. Terminal space faintly hoary, more distinctly striate. Hind wings concolorous with subterminal line alone distinct, *black*, obliterate on costal region. Wings dentate; fringes concolorous. Beneath without stigmata, paler, unicolorous, brown. Body parts concolorous. *Expanse* 43 mil. Canada, Mr. Saunders.

This cannot be *uniformis*, CAN. ENT., 7, 148, because that species is said to have "the subterminal line only seen as a black diffuse shade crossing the wings." This line is linear and very distinct in *unilincata*, and it is brown, its outer line bright ochre, on primaries. In *Zale horrida* there is a rounded discal sinus to the s. t. line, wanting in *unilineata*.

Ypsia umbripennis, n. s.

♀. Size and markings of *undularis*; black with the median space of primaries inferiorly and base of secondaries brownish. At once distinguished from *undularis* by two white linear shades accompanying the t. p. line and before it, from disc to internal margin. The lines and outline of the reniform velvety black. Subterminal line marked with whitish opposite the cell. Hind wings with the white linear shades from the cell to internal margin. Beneath dark brown with empty reniform and transverse lines. Head and thorax black. *Expanse* 43 mil. Grimsby, Mr. Pettit; London, Mr. Saunders.

Very much like *undularis*, but noticeably different by the white lines on both wings. This may be Walker's variety of "*squamularis*"; if so he has not unlikely transposed *coricias* and *undularis*.

NOTES ON LITODONTA, WITH REMARKS ON ONCOCNEMIS.

BY LEON F. HARVEY, A. M., M. D., BUFFALO, N. Y.

In a collection sent by Mr. Belfrage from Bosque Co., Texas, are 15 generally fresh specimens of this genus which I have carefully examined. The type of *hydromeli* ♂ is numbered 527 (violet label), the ♀ 246 (red label). The orange dots following the fuscous blotches of the subterminal line are less evident in the male, and at the base of the wing the orange powdering is less prominent. I am inclined to consider seven specimens, two males, five females, captured from May 3rd to May 21st, as typical.

The variation is in the extent of the orange shadings. The abdomen of the male is a trifle longer, and the hind wings more purely whitish. The antennæ in both sexes are feathered, the tips being simple; in the males the pectinations are a little longer. The hind wings of one female are almost blackish, save the bases, and there is but the slightest trace of orange on fore wings; another is very small, measuring but 26 m. m., the

orange observable only behind the s. t. line. These specimens are numbered 246, 247, 527, 528, 529, two unnumbered. There can hardly be a specific value due to the presence of the orange scales. Throughout the same characters of ornamentation prevail. With other six males no orange is apparent; the green approaches a bluish tinge, with possibly a clearer ground to the wing. Of these three were taken in May, two in August, and one in November. I cannot regard them as differing from *hydromeli*; there are a very few orange scales behind the more isolated spot of the s. t. line, between the second and third nervule, in the November ♂. At the present writing I do not feel justified in expressing the difference by a name. Two of these are numbered 248 and 531. Two other males are different in the total absence of all green color, the prevailing colors being white and blackish. The 10th and 11th of August are the dates of their capture, and they are numbered 530. It may be well to note this difference, whether it be specific or not, expressing it by the name *fusca*. This name is based on perfectly fresh specimens, not faded ones, originally, perhaps, green. There is the slightest possible trace of a warm tint behind the s. t. line. On the costa of the hind wings there is a little shading, the usual faint pale band being apparent. In these two examples there is no essential difference other than noted from the rest of the specimens. As is usual, the t. a. line is denticulate on the costa, then waved and geminate, the white costal filling being present in a marked degree, as well as the white filling to the sub-basal line. From a casual glance at these insects and from the numbers of Mr. Belfrage, I was led to expect two or three species. Now I have to record only one, yet *fusca* may hereafter lay claim to specific value.

Lederer, in writing of the genus *Oncocnemis*, says that the species are found in the Ural and Altai Mountains, and we have no information of any other European locality. Mr. Grote first discovered it in this country, as found in Colorado, thus stamping it more thoroughly, as he thought, as a mountainous insect. But lately it has been captured in three widely different localities. *O. riparia* Morrison = *Chandleri* Grote, found on Staten Island, N. Y., by Mr. Fred. Tepper; *O. Chandleri*, found in Erie Co., N. Y., by Miss Mary E. Walker; *O. augustus* Harvey, collected by Mr. Belfrage in Bosque Co., Texas. Mr. Grote has just described another species, *O. Saundersiana*, Grimsby, Canada (Mr. Pettit). We have here a very wide range, showing conclusively that its habitat is of the low as well as the high lands, of the south as of the north.

NEW MOTHS.

BY A. R. GROTE, BUFFALO, N. Y.

Botis submedialis, n. s.

Allied to *marculenta* G. & R. Stouter, of a duskier yellow. Distinguished by the open, fuscous-ringed discal spots and by the presence of a similar spot on the median space inferiorly, below the median vein. These ringed spots are inconspicuous. The subterminal line of *marculenta* is obsolete. Secondaries with a broader angulated median fuscous fascia; the subterminal again wanting. Beneath fuscous, with the outer transverse line on the fore wings picked out by interspaceal pale blotches.

Expanse 27 mil. Hab. Canada (Mr. Saunders).

Hydrocampa ekthliptis, n. s.

Size of *genuinalis* Led., with the wings more pointed and the external margin more sinuate. Dusky yellow with white spots margined by black lines. Two of these spots superposed on median space, the lower the larger, pyramidal. A large white spot open to costa at outer third, its outer edge rounded; in *genuinalis* this spot has its outer edge alone distinct and concave. A fine brown line, submedially angulate, follows this outer spot on the yellow ground color of the wing. Then a subterminal whitish shade band is bordered inwardly by a diffuse dentate brown line, and outwardly by an even dark line; terminal space even, yellow. This ornamentation is repeated on hind wings where the median spots are confluent. Beneath as above.

Expanse 22 mil. Albany (O. Meske); London (Mr. Saunders).

Eurymene rosaria G. & R. MS.

Entirely pale yellow with the transverse lines appearing as diffuse darker bands, the outer stained with blackish and pink at internal margin. External margin of fore wings rounded. Costa at base flushed with pink. Hind wings with an olive-colored curved abbreviated band at internal angle, outwardly diffusely pink. Beneath more brightly yellow, unicolorous, with the secondaries pink beyond the flexed outer line. No discal marks. Abdomen beneath and fore femora pink. This species has been distributed under the above MS. name, but not as yet described.

It is said to feed on Willow (Saunders). It is a well-sized species with indeterminate lines and no discal spots. The female expands 38 mil.

Eurymene Kuetzingi Grote.

A description and the type of this purple-black species have been sent to Prof. Packard for publication in his expected monograph of the Geometræ. It is named for Mr. Kuetzing, of Montreal, who found the species.

Sisyrosea, n. g.

The type of this genus is the *Limacodes inornatus* of Grote and Robinson. *Sisyrosea inornata* has the male antennæ bipectinate, with converging setose branches, throughout their length. The palpi are prominent, the body thickly scaled. The moths are of the size of the species of *Euclea* as defined by Packard. The color recalls the sack-bearing species of *Perophora*. *S. inornata* is immaculate, without lines (Am. N. Y. Lyc. N. Hist., 8, 1866).

Sisyrosea Nasoni, n. s.

♂ ♀. This species is of a pale brownish color, like its congener, sparsely sprinkled with black. An oblique dark brown line crosses the fore wings from apical third of costal to basal third of internal margin. A second subterminal dark brown line crosses the wing straightly. Both lines are faintly pale bordered outwardly. The thorax is slightly brighter, reddish tinged. *Expanse* 1 inch to $1\frac{1}{4}$.

Collected by Dr. William A. Nason, after whom the species is named, in Virginia.

CANADIAN INSECTS AT THE CENTENNIAL.—It will please our friends to know that the collection of insects sent from the Entomological Society of Ontario to the Centennial Exposition in Philadelphia, arrived there in excellent order. Visitors will find it displayed in the Canadian department in the Agricultural Hall. There are eighty-six cases in all, arranged in a double row on a suitable stand, which is over seventy-six feet in length. We think the collection does great credit to the energy and industry of our members.

NOTES ON ENTOMOLOGICAL NOMENCLATURE.

Part II.

BY W. H. EDWARDS.

(Concluded).

In coitus 26 are 4 species, 3 of which are put in *Myrina* Fab., one of the genera of the *Lycaeninae*, and 1 in *Euselasia* Hüb., of the *Lemoniinae*. But the coitus *Euselasia* is in the other Tribe, and third Stirps of same, the *Napaee*!

Second Stirps *Archontes* (*Papilio*, etc.), 1st family *Heroici*, 2nd coitus *Jasonides*, under which stand *Machaon* and *Turnus*. Third coitus *Euphœades*, under which stand *Glaucus* (black female of *Turnus*), *Troilus* and *Asterias*. That is, according to the Hübnerian view, *Turnus* is nearer to *Machaon* than to its own female, and *Glaucus* is nearer to *Asterias* than to its own male! In Scudder's Revision he puts *Asterias* in the genus *Amaryssus* Dalman, and *Glaucus* into *Euphœades* Hübner, bringing *Turnus* out of *Jasonides* to join his mate, and puts *Troilus* into a new genus, calling it *Pterourus* Scopoli, 1,777. But in the Hist. Sketch he sees fit to condemn Scopoli's *Pterourus* with ignominy, in spite of the inexorable, on account of "the incongruity of the materials of which the genus is composed." However Scopoli's group only contained *Papilios*, *Theclas*, *Hesperians* and heterocerous moths, and why it should be so treated when Hübner's amazing coitus are called generic and made much of, is not clear to the average mind.* But as it would not do to leave *Troilus* outside because of Scopoli's bad taste, Mr. Scudder felt compelled to utilize *Jasonides*, and into it is now thrust *Glaucus*, with which the ghost of Hübner may well feel disgusted. After he had gotten his little

* I have taken some pains to compare the coitus names with the generic names given in the Hist. Sketch, to see if any had been rejected on account of the "incongruity of the materials," but in no case do I discover that this has happened. In *Callidula*, where the Sketch says the coitus is made up of one butterfly and two moths, the author merely suggests that the "genus may be referred to the heterocerous lepidoptera." Had there been two butterflies and one moth, he would have referred it to the butterflies.

black heap so carefully together, for a stranger to pick out one and toss it over to the yellows, shows a degree of irreverence for Hübner's arrangement that is disturbing. So it happens, that in the various works of Mr. Scudder, *Troilus* has gone by three different generic titles within five years, namely, *Papilio Troilus*, *Pterourus Troilus* and *Euphœades Troilus* ! Now all this trouble could have been avoided had the genus been called *Pterourus* Scudder, as it really was. Scopoli had no more to do with Scudder's genus *Pterourus* than had Julius Cæsar.

All the first 18 coitus of the first 2 families of the Archontes are put by Kirby in *Papilio* Linn., he paying no heed to the Verzeichniss divisions of this genus. The 4th coitus, 1st family, contains 6 species, of which our *Cresphontes* is one. Another is *Pelaus* Fab., which is given in the Verz. as a synonym of *Torquatus* Cram., and looking up the latter in Kirby, it stands as male of a distinct species whose female is *Caudius* Hübner, which in the Verzeichniss is in the 2nd family *Priamides*, separated by one family and nine coitus from its mate !

In 5th coitus stands *Pammon* Linn. Its variety *Mutius* is in the 6th as are also its females, *Theseus* and *Romulus*.

In the 2nd family, *Echemon* Hübner is male, and is in the 1st coitus, while its female, *Echelus*, is in the 2nd coitus. So in 1st is *Tellus*, which is the female of *Sesostris*, in 2nd. And *Marcus* in 1st is female of *Aeneas* in 2nd. And *Anchises* Linn. in 1st is a synonym of *Lysander* Cramer, which is in the 2nd.

In the 6th coitus are two species only, one of which stands in Kirby No. 19 on the list of *Papilios*, the other No. 91. And all through these two families the species skip about in Kirby from one part of *Papilio* to another, two adjoining species in one coitus being often separated by species which go to form parts of several other coitus in the Verzeichniss. Thus, between *Anchises* Cramer and the next species, *Echemon*, of the Verz., stand seven species in Kirby, all of which are enumerated by Hübner, and are scattered over 2 families and 3 coitus. So between *Ulysses* Linn. and the next in same coitus, *Philenor* Fab., stand in Kirby 23 of Hübner's species, from 2 families and 9 coitus.

What better illustration could be given of the true nature of this unnatural system than is displayed in these *Papilios*, the coitus based on no tangible character, the species raked together in heaps according to color or size of wing ; males parted from their mates, varieties from the parent species, one dimorphic form from its fellow ; congeneric species in

different parts of the field and even over the fence in the next one, while the most distantly related species of the genus lie side by side. Is it possible that such assemblages deserve to be treated as genera !

Mr. Scudder bears hard upon Herr Koch, because he divided the *Papilios* according to the presence or absence of tails, as *caudati*, *ecaudati*, etc., and calls it "an extraordinary case of the survival of the spirit of mediæval science ; would not have been excusable, scarcely tolerable, if it had been proposed in the middle of the last century ; it is astonishing that it was allowed to appear in the respectable journal of Stettin, and of course they must drop," etc. (Hist. Sketch). But really I do not see why Koch should be thus flouted for dividing the *Papilios* in 1860 by their tails, when in 1875 *Jasonides* is pronounced by Mr. Scudder himself a satisfactory genus, "the hind wings tolerably long and tolerably short tailed." Or *Heraclides*, "the hind wings tolerably short and broad tailed." Why not the same sauce for both sexes of the goose !

Third *Stirps* *Andropoda*, 2nd family, 3rd coitus *Zerene*, thus defined : "Wings bright yellow, black margined, red fringed," and here stand the yellow species of *Colias*, namely, *Palaeno*, *Caesonia*, etc. In the 4th coitus, *Colotides*, come the orange species of *Colias*, *Edusa*, *Eurytheme*, etc., and it is defined, "wings above reddish-yellow with reflections, black margined." No more unreasonable than hundreds of other coitus, and showing very clearly that a coitus is a group of less value than a genus, in some cases. In others they are greater than a genus, as I have said ; and if any of them are co-extensive with a genus, it is plainly by the merest chance. I would note here that *Colotides* would certainly have embraced the N. Am. *Colias* *Eurydice*, which is congeneric with *Caesonia*, but reddish, while the latter is yellow. And the female of *Eurydice* would as certainly have gone in a different coitus, had Hübner known of it.*

In this *Stirps*, *Pieris* Schrank picks species from 1st family, 1st, 2nd, and 8th to 12th coitus.

Tachyris Wall. picks from 2nd, 3rd, 6th, 10th, 11th, and also 2 species from the 3rd *Stips* of the 1st Tribe, *Napæae* !

Pontia Fab. selects from 1st family 4th, and 2nd family 2nd coitus. And the 1st coitus of the 3rd family has 2 species, both of which are put to *Dismorphia* Hüb., one of the coitus of 1st Tribe, 1st *Stirps*, *Nereides* !

* It appears from the above that the name *Zerene*, supposing a coitus name to be applicable as a generic name, cannot be applied to the species *Eurydice*, and therefore to *Caesonia*, as Mr. Scudder has done in his Revision, *Zerene* only including "bright yellow" butterflies. Let us respect Hubner as well as admire him.

And so I might go through the rest of the *gentiles* to the end of the Hesperidæ, and for all that matter, through the volume. But I think I have shown the "utter want of agreement between Hübner's groups and modern genera."

How incomplete and indefinite the characters given to the Stirps are I have shown, and yet these are of all the definitions in the book the ones especially requiring careful elaboration. There is nothing in them that prevented Hübner himself from assigning to one Stirps species which are congeneric with species of another. I have given repeated instances of this. The family has the same style of definition as the coitus, based almost wholly on color, and consequently we see that the limits of neither are at all heeded by the modern systematist. The family names are to-day, in spite of laws and canons, ignored as unmanageable, but the coitus are every whit as bad and can only be used by totally disregarding the characters assigned them by Hübner. In fact these characters in the hands of the systematist are as if they had never been written. He makes up his own genera upon principles which Hübner never dreamed of, and takes what species he likes and leaves what he likes all over this book. If he gave his new genus his own name as the maker of it, not an objection could be made. It certainly is his and can go by the name of another only by a fiction. But among the late genus makers—and genus making has become a special craft—the usage has obtained to select for the group of species to be distinguished, a name from some old author, most especially one of Hübner's coitus names, and whether or not any species enumerated under the coitus be included in the new genus is a matter of not the least moment, any more than whether the definition of the coitus is applicable or not, and affix to it the name "Hub., 1816." Now, why is that? It certainly says as plainly as words can make it, "Hubner created this genus and gave it this name, in 1816," which is false. But by saying it and sticking to it, the modern maker by his pertinacity gets a place for his spurious genus as by right of usage before long, and his claim of priority is held by himself and the rest of the guild to cut off all other authors from the fictitious date to the present day. The scandalous injustice of this proceeding ought to be apparent to every one concerned. And apart from the injustice, the immediate effect is to unsettle the nomenclature and to hold it in that condition. Mr. Scudder excuses himself for having introduced hundreds of names from Hubner and other ancient authors as generic, which names never before were heard of, and nearly all of which are used to supercede the work of com-

petent lepidopterists, by hoping that he "has done something towards introducing some degree of *fixity, logic and precision* in the generic nomenclature." It strikes me rather that "something has been done" in the direction of chaos. And when I consider the mischief caused by the manufacture of spurious genera, and the excessive multiplication of genera on characters almost too trivial to be specific, and the wholesale creation of genera by mere enumeration of species, or by the mention of a single species only as type, which has of late prevailed, I do not hesitate to say that it would have been better to-day for this science had not a new genus been promulgated these last fifteen years. Nearly the whole movement, in this country at least, during this period, has been based in error, and very few indeed of the genera will bear examination.

There is but one remedy for this state of things, and fortunately, it is simple. Let each genus created since the date when the Rules of the British Association were adopted, viz., 1842, be tried by those Rules, and *those found wanting be rejected, no matter who made them.* For genera before 1842, as between two names in use, the prior right should belong to the first named. *But no name then in use should give way to an obsolete or rejected name, even though the latter be of prior date.* And next, *let each genus be called by the name of its real, not reputed, author.* A genus will then stand on its own merits and we shall see but little more of this unseemly and reckless genus making. I hope to see the adoption of Rules to this effect by the Entomological section of the Am. Association at its next meeting, and this will be the first step of real progress in reforming the nomenclature. But the Rules already binding disposes of a very large percentage of the generic names brought forward in the Historical Sketch. Certainly of 400 or more taken from the Tentamen and the various works of Hübner, most especially from this most foolish work, the Verzeichniss bekannter Schmetterlinge.

To show that I do not stand alone in condemnation of Hübner as an authority for genera, I will give in conclusion the language of certain lepidopterists, *facile principes*, whose opinions on this subject are entitled to consideration.

Dr. A. Speyer, Ent. Zeit. Stett. 1875, after stating that he had never seen the Tentamen and therefore could not pass judgment upon its names, thus says of the Verz. bek. Schmett.: "*It passes for an undisputed principle that other rights are needed to introduce a new species than merely giving it a name. It must be accompanied by a description or a drawing*

which shall make it recognizable. This same principle is carried out no less in regard to generic names. They first receive their authority from the subjoined sufficient characterization. We may give the most liberal interpretation to this demand, and indeed must do so, especially with regard to the earlier authors. One may perhaps go so far as to regard a genus as sufficiently characterized by the species correctly placed beneath it. But hardly any one could assert that the great majority of Hübner's genera could be considered as scientifically established even with the most liberal interpretation. The greater part of them are only described according to agreement, often very superficial, in color and markings and perfectly insignificant characteristics. The names in this catalogue have besides no more right to stand than other so-called catalogue names—for instance, most specific names in the Vienna Catalogue. They may be used in the erection of new genera, since they are mostly well chosen, but by no means have a right to supplant later but well founded genera."

"This work (Hübner's Verzeichniss) had been systematically set aside as an authority by most European entomologists because it was felt that his so-called genera were mere guesses founded on facies alone—happy guesses no doubt sometimes, but as frequently wrong as right—and wholly without such definition as was held, even in his own day, to be required to constitute a new genus. . . . *The proper course to be taken is to reinstate every name which of late years has been made to give place to one of Hübner's, and further to treat the Verzeichniss as a mere Catalogue which can never be quoted as an authority for genera. . . .* Such old names as Chionobas, Agraulis, Eresia, Terias, Callidryas, Anthocharis, with many more, are changed for others which most of us have never heard of, and which generally are to be found in no other work than Hübner's obsolete and worthless Catalogue. . . . As a matter of justice it may be maintained that we should recognize the careful and elaborate definition of a Doubleday or a Westwood, rather than the childish guesses of a Hübner, and should quote the former as the authority for the genus, even should they out of courtesy have adopted the names of the latter." A. R. Wallace, Ann. Address, before cited.

"We cannot approve the names borrowed from the coitus of Hübner and applied by certain entomologists to their so-called genera. Hübner had never seen in nature the sixth part of the Lepidoptera which he has undertaken to group from their superficialities. He has given no where a positive character to his coitus, in which the species are often assorted by chance. We could cite more than one instance where a variety is not

placed in the same group with its parent species. *What would be said of a botanist who should define his genera by the color of the flowers, the marbling or the pinking of the leaves!* It is for these reasons that, after the example of Ochsenheimer, of Latreille, of Godart, of Treitschke, of Duponchel, of Gueneé, etc., we reject this sort of genera and consider them as not having been made." Dr. Boisduval, Spec. Gen. Het. Spinn., 1874.

"We should likewise speak of the classification of Hübner, but we have never been able to comprehend the principle on which it is based. This author so often places in distinct genera species between which are scarcely found specific distinctions, that the whole forms for us a chaos almost unintelligible. In our opinion, while Hübner is the first of iconographers, he is the last of systematists." Boisduval, Spec. Gen., I, p. 153, 1836.

"I must not pass in silence his Systematic Catalogue, to which there seems some disposition to return after it has been justly neglected for thirty years. I cannot deny that it contains some happy hits, some natural groups, but one could scarcely assert that there are many such. On the other hand, he has multiplied genera with an incredible recklessness. Many pages would be required in citing all the examples. . . . Our *Xanthia* are scattered over 7 coitus, *Agrotis* comprises not less than 17! And yet one would be mistaken if he thought this extreme division permitted Hübner to bring together only analogous species. The genera of fewest species are often the most heterogeneous. (Here several examples are given.) His Tribes agree among themselves no better than his genera. I have given these examples because there seems to day a desire to erect the Verzeichniss into an authority, and it was well to show why I consider it, with my associate (Boisduval), as not having been made, and why I have not felt myself obliged to employ the generic names of this still-born work." Gueneé, Spec. Gen. Noct. I, Pref., p. 73, 1852.

NOTES ON PREPARATORY STAGES OF DANAIS ARCHIPPUS.

BY W. H. EDWARDS, COALBURGH, W. VA.

On the 14th May last I found several eggs of *archippus* on milkweed. These hatched on the 17th inst. On the 19th all had passed first moult. On the 21st all had passed second moult. On the 22nd two

passed third moult. On the 25th these two passed fourth moult, and were one inch long. They continued to grow till the 29th, when they measured 1.8 inch, and in the morning had fixed for chrysalis. Made chrysalis in the afternoon of same day, and the butterflies emerged on 9th June. Time from hatching to chrysalis 12 days. A female, which I confined on milkweed, laid eggs on 24th May, which hatched on 30th, by which the duration of the egg stage would be 6 days, of the chrysalis 11 days, deposition of the egg to the butterfly 29 days. This is surprisingly rapid. The larvæ which delayed a little the third moult passed the same shortly after, and became butterflies within from one to three days after the first two mentioned. There has been some uncertainty as to the number of moults of this species, some authors giving three only. I have had for two years a series of drawings made by Miss Peart, in 1873, representing all these stages, as followed out by herself, near Philadelphia, and she found and figured the four moults. In this region there are at least two broods annually, the later one appearing about the 1st of October, and the butterflies hybernate.

CORRESPONDENCE.

DEAR SIR,—

In a recent number of the C. E., my friend, W. V. Andrews, desired to know if any of the readers of the ENT. had taken brown larvæ of *Ceratonia quadricornis*. Three years ago they were common here on the English elms, and a large proportion of them were brown; indeed, the green ones were the exception. ROBERT BUNKER, Rochester, N. Y.

DEAR SIR,—

I recently had the pleasure of receiving a female *Smerinthus cerisii* Kirby, which I believe is the only known example of that sex. This interesting specimen was captured in Maine. Yours truly,

GEO. W. PECK, New York.

The Canadian Entomologist.

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No. 7

ON CATOCALA PRETIOSA, N. S.

BY J. A. LINTNER,

New York State Museum of Natural History, Albany, N. Y.

The species is closely allied to *C. polygama* Guen. Its distinctive features may be more clearly appreciated by a differential comparison with that species. The basal region is conspicuously and broadly shaded with black, deepening toward the anterior transverse line; in *polygama*, shaded with ferruginous. The anterior transverse line is moderately oblique in its general direction, tending to the posterior third of the internal margin, geminate, distinctly separated by white below and slightly above the submedian: in *polygama* the line is quite oblique, tending to, or very near to, the internal angle; preceded below the submedian by gray and ferruginous scales.

The posterior transverse line has the extra-cellular teeth moderate, unequal, the lower one in cell 4 being improminent; moderately outwardly angulated (not toothed) on the median fold before the sinus; the sinus short, not extending to the middle of the wing, the line narrow with ferruginous and white below it; from the sinus running direct and slightly outwardly oblique to the internal margin, followed by a white line: in *polygama* the two teeth are conspicuous and nearly equal; sharply toothed outwardly on the median fold, as in *cratægi*; sinus long, reaching the middle of the wing, the line broad, with ferruginous on each side and without white below; below the sinus, a long and sharp tooth bordering the internal margin.

The two transverse lines are separated on the submedian nervure by a space equal to the width of cell 2 on the terminal margin, whence they

run parallel to the internal margin: in *polygama*, they are nearly or entirely united on the submedian, beyond which they widely diverge and again wholly or nearly unite on the internal margin.

The reniform is broadly surrounded by white: in *polygama*, narrowly. The sub-reniform is round, its outline defined by black scales; it touches outwardly the median shade line on vein 2; of the two transverse lines, it is nearer to the posterior, or midway between them: in *polygama*, it is subquadrangular, defined by ferruginous scales, is quite removed from the median shade line, and is nearer to the anterior transverse line, sometimes quite approximate to it.

The subterminal line is dark brown: in *polygama*, pale gray. The posterior wings have the marginal band slightly narrowed on the median fold: in *polygama*, it is separated or quite constricted; beneath, the cellular fold is shaded with black (not in *pretiosa*).

In size it is smaller than *polygama*, five examples of which before me measure in expanse of wings, males 1.80, 1.85 and 1.90 inch; females 2 and 2.1 inches. *Pretiosa* males 1.60 and 1.70 inch; females 1.80 inch. The wings are proportionally broader than in *polygama*, they are more clouded with black basally, with more white medially, and with less ferruginous in the terminal region.

Three examples of the species were captured by me at sugar, at Schenectady, N. Y., last year—the two males, in perfect condition, on July 8th and 10th, and the female, somewhat worn, on July 16th.

A fine example of *C. cratægi* Saunders was also taken by me at sugar, on the 17th of July. I had recognized it as an undescribed species at the time of its capture, and had so indicated it in my collection. With the larval state of nearly all of our *Catocalas* unknown, it is very gratifying that Mr. Saunders has been so fortunate as to be able to accompany the description of the imago with that of its larva.

C. polygama was taken but once by me at sugar last season, viz., on the 7th of July, in perfect condition. The examples which I have seen of this species present very little variation. The variability which has been ascribed to it has its existence probably in the confounding with it of *cratægi*, *pretiosa* and perhaps some other species.

NEW SPECIES OF NEBRASKA ACRIDIDÆ.

BY LAWRENCE BRUNER, WEST POINT, NEBRASKA.

Ædipoda Nebrascensis, n. s.

Elytra and wings longer than body; elytra spotted; wings blue at base, gradually merging into black.

Female—Vertex broad; middle foveola circular, open in front with a slight median carina; frontal costa rather narrow, somewhat expanded at ocellus; sulcate, expanding at lower extremity. Lateral costa nearly parallel to frontal. Median carina of pronotum crested, as in *Æ. Carolina*, only much higher; cut in front of middle by last transverse incision of pronotum. Posterior part highly arcuate; anterior part nearly straight. Lateral carinae slight, approaching a little in front of middle, where they are cut by two transverse incisions; then running parallel to median carina to base of occiput. Posterior margin of pronotum as in *Æ. Carolina*. Elytra wide, slightly arcuate in front, nearly straight behind; about one-third longer than body. Wings one-eighth of an inch less. Posterior femora a little shorter than body, slightly furrowed below. Antennae about as long as head and thorax.

Color—dried (not alcoholic)—Dirty yellow. Head and pronotum cinereous, with a greenish tinge. Clypeus lurid. Elytra dirty yellow, spotted with brown, the spots on outer half running together, forming irregular narrow transverse bands; median vein brown half its length, bordered by yellow. Spots on inner portion large. Wings bluish at base for about one-fifth their length; outer third yellowish, sprinkled with brown spots at apex. The yellow forms a continuous wide band along the posterior portion and around the inner angle half way to the base. Disk black. Posterior femora crossed on outside by two light brown bands; internally by two black bands. Apex black. Posterior tibiae yellow, with dark spines. Venter yellow. Dorsum blue with a yellow spot on centre of each of the 1-4 segments, remainder brownish. Sides brown, antennae rufous.

Length—♀, 1.75 inches; expanse of wings 4 inches; elytra 1.90 inches; posterior femora .85 inch; posterior tibiae .75 inch; antennae .60 inch.

Habitat—West Point, Nebraska; in August. Male unknown.

Pezotettix gracilis, n. s.

Frontal costa sulcate below the ocellus in ♂ ; slightly depressed at the ocellus in female. Elytra small. Median carina of pronotum slight, cut by the last transverse incision of pronotum behind the middle, also by the central transverse incision, nearly straight. Lateral carinae distinct, approaching near the centre. Posterior margin of pronotum obtuse in ♀, sulcate in ♂. Elytra short and narrow. Posterior femora as long as abdomen. Male cerci short, rounded, and slightly spatulate, curved inward; lower ends somewhat curved upward and flattened. Female cerci short, thick and pointed.

Color—Varies from a bright green to an olive brown. Face green; cheeks whitish; a broad black stripe from the eye to last transverse incision of pronotum, sometimes to extremity of pronotum. Below this the pronotum is whitish. Disk of pronotum brown. Occiput brownish. Antennae olive green, tips black. Posterior femora pea green, sometimes olive green, with tip black. Posterior tibiae green; base and spines black. Venter white. Dorsum from green to light brown. Male's last segment of abdomen margined posteriorly with black. Sternum greenish white.

Length of ♀, .75 inch.; elytra .13 inch.; posterior femora .45 inch. ♂ .62 inch.; elytra .10 inch.; posterior femora .40 inch.

Habitat—Omaha, Nebraska; August to October.

Pezotettix occidentalis, n. s.

Large, stout. Elytra in female half as long as abdomen; in male about two-fifths as long. Male antennae as long as posterior femora.

Vertex not prominent, carinate; foveola wide, slightly elongate. Frontal costa somewhat sulcate in male; plane in female. Eyes large, inflated in male; ordinary in female. Pronotum with sides parallel; margins acute in male, rounded in female. Posterior transverse incision behind the middle; deep in male, ordinary in female. Elytra about two-fifths the length of abdomen, wedge shape. Four anterior femora inflated in male, much curved. Posterior femora passing abdomen one-fifth of their length. Female cerci short and pointed; male cerci large, flat, strong, slightly notched anteriorly, curving inward at extremity, where they are spatulate. Genital plate shape of letter U, large and wide. Entire insect sparsely covered by short hair.

Color—Male dark piceous, variegated with white. Face cinereous; cheeks whitish, occiput piceous with a white stripe from eye along lateral

carinae of pronotum to last transverse incision of pronotum. A wide black stripe on side of pronotum from eye to last transverse incision ; below this is a narrow white line bordered below by a narrow black line ; remainder dark brown. Eyes posteriorly streaked alternately with black and yellow. Elytra brown, lighter above, unspotted (sometimes a few spots visible). Posterior femora with three white and three black bands ; lower inner side and sulcus bright red. Posterior tibiae red, bluish toward base. Spines near base light ; remainder black. Venter yellow.

Female differs from male in being of a uniform brown color. Eyes not colored, and bands on sides of pronotum nearly obsolete in some specimens, dim in others. Ovipositor varies from red to yellow, with black tips.

Dimensions—♀ 1.10 inches ; elytra .31 inch. ; posterior femora .55 inch. ♂ .95 inch. ; elytra .25 inch. ; posterior femora .51 inch

Habitat—Omaha, Nebraska ; August to November.

ON A NEW CANADIAN BOMBYCID MOTH.

BY A. R. GROTE, BUFFALO, N. Y.

Both sexes of a new genus and species referable to the group *Ptilodeutes* are represented in specimens taken by Mr. Geo. Norman (No. 52) at St. Catharines, and for which I propose the name *Ellida gelida*. A male of this species is also in the collection of the Buffalo Society, from New York State. The eyes are naked, ocelli absent, legs rather short and unarmed. The maxillae are moderate ; labial palpi short, applied to the front, second article shaggily haired, third distinct. The abdomen is untufted, hardly exceeding secondaries. Male antennae bipectinate, densely setose ; female antennae more shortly and finely bipectinate. Head closely applied to the thorax. Anal hairs in the male gathered at each side, projecting slightly, not forming a prominent furcation as in *Coelodasya*. The habitus recalls the Noctuid group Bombyciae. Fore wings 12-veined, 5 intermediate between 4 and 6, cell open ; 7 out of 8 ; 9 out of 8, a short furcation at apex. Hind wings with veins 7 and 8 separate, 7 running very close to 8 for about three-fourths its length from

the base of the wing; 5 weak; cell open; 6 out of 7 beyond, not *before*, a slight projection, on 7, which projection indicates the position of the cross vein. It will thus be seen that the neuration differs sensibly from that of the *Bombyciæ* (*Cymatophoridae* H. S.) The position of vein 5 is different from that in the *Noctuelitæ*; but attention is called here to the fact that in the genus *Nolaphana* (which possesses ocelli) vein 5 is nearly midway between 4 and 6 on primaries.

Ellida gelida is a gray moth, having a superficial resemblance to *Pseudothyatira expultrix*. The collar is discolorous, pale buff, recalling that of *Pygaera pucephala*, edged with black. The wings are long, costa of primaries convex. Interior line represented by three parallel curved black lines, obsolete inferiorly. A black curved streak in a whitish shading on the disc. Outer and subterminal and basal lines faint. Outer line dentate. Between the subterminal shade and the very narrow even continued terminal line at base of fringes, is a distinct line of blackish brown hue, narrowly interrupted on the veins and inferiorly disconnected in the female specimen before me. Hind wings uniform pale fuscous, with whitish fringes. Beneath whitish fuscous, with a line and spot on hind wings. *Expanse* 42 mil.

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

Since the reprint of Kirby's *Fauna Boreali-Americana* began, much has been learned concerning the species of Coleoptera therein described or mentioned, so that at the present time very few remain unidentified. Through the kindness of the authorities of the British Museum, every facility was granted to Dr. Leconte and myself for the study of Kirby's types, and the results of these studies have already been made known by Dr. Leconte. It will be noticed in very many places that the synonymy here given differs very greatly from that given by Mr. Bethune, who compiled from the best known sources all that was at the time known or guessed concerning Kirby's species.

The present paper is necessarily in great part a compilation, but sufficient new material is presented to render it worthy of appearing as a whole, so that Kirby's species may be at once determined without the necessity of consulting scattered publications.

A few words are necessary to a correct understanding of the paper. The species named by Kirby are in small capitals. Should names in their entirety remain valid, no remarks are made, as in 1, 16, &c. Should the generic name only be changed, the species is quoted as "is a —," as in 25, 28, 37, &c. Should the specific name be changed, the species is quoted as in 3, &c., and the true name is in small capitals also. In some instances, Kirby's species not having been identified, the species have received more recent names and are well known; in this case the latter name (being a synonym) is quoted in italics, as in 58 and 59, so that those having the Kirbyan species under the more recent names may change them.

1. *Cicindela hirticollis* Say.
2. " *repanda* Dej.
3. " *PROTEUS* Kby., is *DUODECIMGUTTATA* Dej.
4. " *OBLIQUATA* Kby. This is a variety of the species previously described by Say under the name *VULGARIS*. Herbst anteriorly named the species *TRANQUEBARICA* with a false locality.
5. " *vulgaris* Say (see above).
6. " *purpurea* Oliv.
7. " *ALBILABRIS* Kby., is *LONGILABRIS* Say.
8. *Casnonia pensylvanica* Dej.
9. *Cymindis MARGINATA* Kby., is *CRIBRICOLLIS* Dej.
10. " *UNICOLOR* Kby. Subsequently described as *hudsonica* Lec.
11. *Sericoda BEMBIDIoidES* Kby. is a *PLATYNUS*.
12. *Brachinus cyanipennis* Say.
13. *Carabus Vietinghovii* Adams. This species is found in Alaska and extends its habitat toward British Columbia and also toward the Hudson's Bay region. Numerous specimens were collected by the late Robt. Kennicott in Alaska.
14. " *ligatus* Knoch is *VINCTUS* Weber.
15. *Calosoma calidum* Fab.
16. " *FRIGIDUM* Kby.

17. *Helobia* [*Nebria*] *CASTANIPES* Kby. An immature form of *N. SAHLBERGI* Fisch., described anteriorly to Kirby, from Alaska.
18. *Chlaenius sericeus* Forst.
19. " *IMPUNCTIFRONS* Kby. is *PENSYLVANICUS* Say.
20. " *nemoralis* Say.
21. " *QUADRICOLLIS* Kby. is *TRICOLOR* Dej. *var.*
22. " *CORDICOLLIS* Kby. This species, anteriorly to Dr. Lecomte's visit to the British Museum (1869), was erroneously considered to be *chlorophanus* Dej.
23. " *EMARGINATUS* (Kby.) The type of this species could not be found in the British Museum. It is not identical with Say's species, and as the name is pre-occupied, it would be better to drop it entirely from our lists.
24. *Platynus ANGUSTICOLLIS* (Kby.) is not the European species of that name, but our common *SINUATUS* Dej.
25. *Agonum extensicolle* Say is a *PLATYNUS*.
26. " *PICIPENNE* Kby. is probably the species subsequently described as *PLATYNUS luteulentus* Lec. The varieties E and D are distinct and are *Plat. RUFICORNIS* Lec.
27. " *SORDENS* Kby. Has been named in some collections *fuscescens* Chaud.
28. " *melanarium* Dej. is a *PLATYNUS*.
29. " *SEMINITIDUM* Kby. Probably the same as *PLATYNUS chalcus* Lec.
30. " *SIMILE* Kby. In doubt.
31. " *AFFINE* Kby. is *PLATYNUS Harrisii* Lec.
32. " *ERYTHROPUM* Kby. The name is pre-occupied and *PLAT. SUBCORDATUS* Lec. must be used.
33. " *cupripenne* Say. is a *PLATYNUS*.
34. *Calathus gregarius* Say.
35. *Platyderus NITIDUS* Kby. is *PTEROST. ERYTHROPUS* (Dej.)
36. *Argutor BICOLOR* Kby. is *PTEROST. PATRUELIS* Dej.
37. " *FEMORALIS* Kby. is a *PTEROSTICHUS*.
38. " *MANDIBULARIS* Kby. is a *PTEROSTICHUS*.
39. " *BREVICORNIS* Kby. Probably the same as *FASTIDIOSUS* Mann. This and the preceding species belong to

the *Cryobius* group of *Pterostichi*, in which the species are very difficult to separate.

40. *Omasus orinomus* Knoch. is a *PTEROSTICHUS*.
41. " *NIGRITA* Curtis (Kby.) This species is erroneously determined by Kirby and does not appear to differ from *PTEROSTICHUS CAUDICALIS* Say, from specimens in my cabinet from Hudson's Bay region.
42. " *PICICORNIS* Kby. is *PTEROST. MUTUS* Say.
43. *Stereocerus SIMILIS* Kby. is *AMARA HAEMATOPUS* (Dej.)
44. *Curtonotus convexiusculus* Steph. (Kby.) Erroneously determined by Kirby; is *AMARA LATICOLLIS* Lec.
45. " *RUFIMANUS* Kby. If the hind angles of the thorax are prominent, as stated by Dr. Leconte (Proc. Acad. 1873, p. 323), this species is rather *LATICOLLIS* than *LACUSTRIS*, as there stated. The species of *AMARA* in this vicinity need a careful revision, when their number will be considerably decreased. No actual comparison of Kirby's and our own types have been made, and any positive expression might mislead.
46. " *BREVILABRIS* Kby. Identical with the preceding species.
47. " *LATIOR* Kby. is *AMARA (Bradytus)*. Described since Kirby as *libera* Lec., *lacvistriata* Putz. and *Oregona* Lec. (See Trans. Am. Ent. Soc., 1875, p. 128).
48. *Poecilus lucublandus* Say is a *PTEROSTICHUS*.
49. " *CASTANIPES* Kby. is a variety of 48.
50. " *chalcites* Say is *PTEROSTICHUS SAYI* Brulle.
51. *Amara VULGARIS* Latr. (Kby.) is not that species, but *ERRATICA* Sturm.
52. " *INAEQUALIS* Kby. is *INTERSTITIALIS* Dej.
53. " *impuncticollis* Say.
54. " *PALLIPES* Kby.
55. " *LAEVIPENNIS* Kby. is a smooth *ERRATICA* Sturm.
56. " *DISCORS* Kby. is *CHALCEA* Dej.
57. *Harpalus PLEURITICUS* Kby.
58. " *BASILARIS* Kby. is *obesulus* Lec.
59. " *OCHROPUS* Kby. is *desertus* Lec.
60. " *INTERPUNCTATUS* Kby. is probably merely a variety of *ANISODACTYLUS NIGRITA* Dej.
61. " *LONGIOR* Kby. is *longicollis* Lec.

62. Harpalus LATICOLLIS Kby. is ANISODACTYLUS NIGERRIMUS Dej.
63. " carbonarius Say is ANISODAC. CARB.
64. " ROTUNDICOLLIS Kby. is AMPUTATUS Say.
65. " STEPHENSII Kby. is AMPUTATUS Say.
66. Stenolophus VERSICOLOR Kby. is FULIGINOSUS Dej.
67. Trechus TIBIALIS Kby. is BRADYCELLUS TIBIALIS.
68. " AUFICRUS Kby. is BRADYCELLUS COGNATUS (Gyll).
69. " FLAVIPES Kby. is BRADYCELLUS RUPESTRIS Say.
70. " IMMUNIS Kby. is STENOLOPHUS CONJUNCTUS Say.
71. " SIMILIS Kby. is AGONODERUS COMMA Fab.
72. Isopleurus NITIDUS Kby. is AMARA SUBAENEA Lec.
73. Patrobus americanus Dej. is LONGICORNIS Say.
74. Peryphus BIMACULATUS Kby. This species of BEMBIDIUM occurs also in Colorado.
75. " SORDIDUS Kby. Immature specimen of the preceding.
76. " SCOPULINUS Kby. is BEMB. *gelidum* Lec.
77. " RUPICOLA Kby. is BEMB. RUPESTRE Fab.
78. " CONCOLOR Kby. is BEMB. *salebratum* Lec.
79. " PICIPES Kby. The type of this is in very bad condition. Uncertain.
80. " quadrimaculatus Linn. is a BEMBIDIUM.
81. " NITIDUS Kby. is a BEMBIDIDM.
82. Tachyta PICIPES Kby. is TACHYS NANUS Gyll.
83. Notaphus NIGRIPES Kby. A BEMBIDIUM which occurs also in Oregon and British Columbia.
84. " INTERMEDIUS Kby. is probably BEMBIDIUM *rapidum* Lec.
85. " VARIEGATUS Kby. The specific name is pre-occupied. It is now known as BEMBID. PICTUM Lec.
86. Bembidium impressum Gyll.
87. OPISTHIUS RICHARDSONII Kby. Occurs in British Columbia, Oregon, Northern California, and Colorado.
88. Elaphrus CLAIRVILLII Kby. for a long time called *politus* Lec.
89. " INTERMEDIUS Kby. This species forms one of the varieties of that known in our collections as *Californicus* Mann. I cannot see any difference between this and the European RIPARIUS.
90. " OBSCURIOR Kby. is probably a small *obliteratus* Mann.
91. Notiophilus aquaticus Linn. (Kby.) is SEMISTRIATUS Say.

ON JACOB HÜBNER AND HIS WORKS ON THE BUTTERFLIES
AND MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

For a long time that school of Entomologists which has for its basis the view that there are but few genera in the Butterflies and Moths, and that the more minute characters which these insects offer are not of sufficient value to support genera, have held an almost undisputed sway in the scientific literature on the subject. The first opponent of these views was Jacob Hübner, whose works form the subject of the present paper. A single author, in the comparatively obscure town of Augsburg, in Germany, Jacob Hübner found no adherents to his views, and his works fell into obscurity. The Viennese Entomologists misapplied many of the few generic names of Hübner they adopted, and abused him. Their example was followed by the French Entomologists, including the abuse. In England Hübner's ideas found a more favorable reception from Stephens in 1829, and here and there, in Germany itself, a sort of half recognition has been extended to Hübner from time to time, in some few cases and under some limitations.

So far as Hübner's works are concerned, they must be studied from two separate aspects. First as to Hübner's fundamental idea that the Butterflies and Moths offer many genera, independent of the question as to whether the names Hübner proposed in consequence for these genera, be reinstated in modern systems of classification or not.

And here the question arises respecting the value of all systems of classification and as to their purport. And we shall be agreed that while our conceptions of genera and species and other divisions are abstract, the purpose of our system of nomenclature is to express briefly inter-relationship among animals, no less than to distinguish them. Under the view that dissimilar structures are allowed to be embraced under the same generic name, our systems become clearly defective to this extent. And as the question of to-day is the origin of the different kinds of animals, we are clearly on the right path if we seek to define our genera with more precision and to associate only those species under one genus which agree in minuter points of structure. Just this sort of nearer and more critical comparison is what we now evidently need in order

to discuss the question of geographical distribution to any purpose or advantage and to arrive at some nearer comprehension of the way in which species may have differentiated. And it seems reasonable that we should express the results of such comparison in our nomenclature. Not expressing them, their record tends to become obliterated. So that in this direction we find that Jacob Hübner in his work is more nearly up to the requirements of to-day than are his critics. And it is only this serious study of Entomology that relieves the whole subject from the charge of childishness which we hear not unfrequently made against it, and which we cannot well otherwise refute. To merely catalogue species of insects is to bring the study of Entomology down to the level of an arrangement of curiosities of any description. It needs some higher spirit to elevate it and to relieve it from the imputation of uselessness.

The second question with regard to Hübner and his works is whether we are to recognize the right of his generic names, proposed so long ago, to be used now for one or more of the species he included under them. It is a question which must be answered in the affirmative under the law of priority, since Hübner is post-Linnean, and wrote on genera from 1806 to 1828.

But it is a question which is confused by technical objections against the form and style of Hübner's generic definitions. Hübner has published two works which we shall here consider (omitting the question as to "Franck's Catalogue" for the time), viz., the *Tentamen* and the *Verzeichniss*. The first is a single leaf and contains a sketch of a system of classification in which a number of generic names are proposed and defined by the enumeration of a single known and named species under each. The second is an attempt to classify all the known Lepidoptera of the world under genera very briefly and superficially described.

To the acceptance of these works and the adoption of the generic names therein contained, comes now Mr. W. H. Edwards in the pages of the *CANADIAN ENTOMOLOGIST* in opposition, and brings with him Dr. Hagen as an ally and one upon whom he depends as full of a knowledge of the literature on the subject. The attack in the March number is mainly on the *Tentamen*, and we will see what it consists in.

There is mainly brought forward, not without ingenuity, the plea that Hübner never intended that the *Tentamen* should be adopted. The argument is sustained in two ways. First by the language of the *Tentamen*; second by the statement that it was not known to contemporary writers on its subject.

As to the first, Hübner's language is that he submits his Tentamen to skilled persons to be examined and pronounced upon. And this sort of language cannot be fairly tortured to mean anything more than that the work was experimental and tentative rather than absolute and final. What otherwise is all work on this subject? Skilled persons will use of any work what seems to them best and useful, without regard to the opinion of the author on his own work. That Hübner's attitude was modest does not authorize us to ignore him, and should rather urge us to examine with the more care what he has written.

The true criticism of the statement that the Tentamen was not known to writers of Hübner's time is more difficult to give, nevertheless we will attempt it. And first we will examine what Mr. W. H. Edwards, seconded by Dr. Hagen, has to say on the subject. We quote from pp. 44 and 45 of the CAN. ENT. their argument as follows:

Ochsenheimer, Schmett. Eur. iv, 1816, says: "Hubner has under the title Tentamen, &c., published on a quarto sheet a sketch of a system of Lepidoptera, in which to the divisions adopted by him are given generic names of unequal value. Hubner seems to be aware of this himself, for he says in concluding, 'let no one suppose that this arrangement will require no farther correction.' *This sheet I saw only long after the printing of my 3rd Vol. was done.*" This was then after 1816, as Ochsenheimer's 3rd Vol. bears date that year. Mr. Scudder has inadvertently copied this as 1st Vol., 1807, instead of 3rd Vol., 1816. So as Dr. Hagen, in a note, says, "the Tentamen was not known to the chief Lepidopterologist of his day for ten years or more after it was printed, though he was in intimate communication with Hubner, and that he did not know it shows clearly that Hubner did not think it of importance enough to be communicated to him."

Now we claim that it is a mistaken criticism of the facts to implicate Ochsenheimer as a party to the ignoring of the Tentamen, and that the onus of this procedure falls on Treitschke, his narrower disciple, and on Boisduval, who wrote of "mon genre" at Hübner's expense. And to do this we have to correct Mr. Edwards' dates. The 3rd Volume of Ochsenheimer bears date 1810, instead of 1816. So that, the Tentamen being issued in 1806, Dr. Hagen's *ten* years is reduced at once to four.

We may admire Dr. Hagen's talent for argument, but it is wide of bringing a true conclusion. The times were not favorable to a rapid interchange of publications, and although this consideration may be insufficient, it is not without its force applied to the four years of 1806—1810. But in order to accept Dr. Hagen's conclusion we have to believe that a man deliberately prints a new system of classification "for the purpose of submitting it" to his fellow naturalists and then inexplicably

"considers it of no importance." That Hübner *did* consider it of importance is shown by his having built the later Verzeichniss upon it. We shall find by careful study that Hübner was a most consistent Entomologist, and the criticism which pronounces him as vacillatory to be worthless. So much is to be plainly gathered from his works themselves.

And, after all, after four years' time Ochsenheimer *does* get the Tentamen, and in his fourth volume, 1816, speaks of it in a manner which shows a desire to adopt what he could of it. His language is both friendly and appreciative, and in his list he quotes it in the synonymy and therein adopts certain of the genera on the authority of the Tentamen, as "*Cosmia*," "*Xylena*," "*Agrotis*," "*Graphiphora*," etc. On the whole he adopts more than he rejects, and where he rejects we are given no reason for the discrimination (e. g. *Heliophila*). But now we can see the value of Mr. W. H. Edwards as a critic. He makes Ochsenheimer to say: "*This sheet I saw only long after the printing of my 3rd Vol. was done,*" and comes to a full stop. *But Ochsenheimer comes to no full stop!* No, he goes on, after a comma, *therefore I could not earlier have adopted anything out of it.** So that Ochsenheimer *apologises* for an unavoidable neglect and in his fourth volume does Hübner a tardy but not altogether inadequate justice. For the names above cited, and others afterwards credited by Ochsenheimer's followers to himself, *are* taken by Ochsenheimer from the Tentamen and credited to Hübner by Ochsenheimer himself. And the criticism that pronounces Ochsenheimer the chief Lepidopterologist of his day we cannot accept. Ochsenheimer was, at best, provincial, and from the nature of his work could not be otherwise. He is not to be compared to Hubner for grasp of his subject. His follower, Treitschke, is still narrower and on him and the school to which he belonged falls the blame for having appropriated, misapplied and ignored the work of Hubner.

A final argument of Dr. Hagen's, that the booksellers of the time did not advertise the Tentamen, may be dismissed with the remark that it certainly was published as proved by Ochsenheimer in 1810, and the question, whether the failure to catalogue a work by a bookseller is sufficient to cancel its publication?

I conclude that if we wish to follow Ochsenheimer we must adopt the Tentamen. I draw attention to the fact that Ochsenheimer's genera

* daher Konnte ich fruher nichts davon aufnehmen, 4, viii.

in the 3rd Volume are equally without diagnosis, and yet have been accepted. It is right here that the struggle has come in between the Hubnerian and Treitschkean ideas as to generic characters in the Lepidoptera. For the time the latter have obtained, and the former have been rejected. But now Hubner's ideas are prevailing, and with them his names will be reinstated in their undoubted right—a right which should not be questioned, for the followers of Treitschke are convicted both of appropriating Hubner's names, and endeavoring to implicate Ochsenheimer after his death in the transaction.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

LAVERNA.

L. ? (Anybia ?) gleditschicella. N. sp.

The form of the palpi is that of *Anybia langiella* St., as represented *Ins. Brit.*, v. 3, but the wings are a little longer than those of *langiella* are there represented, though the hinder pair have the same form. The neurulation of the fore wings is that of *L. epilobiella* (fig'd *loc. cit.*) except that the apical vein is obsolete in the single specimen examined by me; that of the hind wings also resembles that of *epilobiella*; indeed, if the dorsal and submedian veins were represented in the figure of *epilobiella*, and the sub-apical or discal branch was produced forwards into the cell, the neurulation would be that of this species. All of the wing veins, except the furcate apical branch of the fore wings, are unusually distinct in this species.

In *Laverna*, however, the species are usually rather coarsely scaled and the wings are usually ornamented with tufts of raised scales, whilst this species is remarkable for the fineness of its scales and its perfect smoothness. But the genus *Laverna* is almost as indefinite as *Gelechia* itself. So far as ornamentation is concerned, this species might be placed in *Asyctina*.

In repose *gleditschiælla* sits very flat upon the surface on which it rests. The ♀ has the last joint of the abdomen long and conical, and the antennae do not quite reach to its apex, while in the ♂ they exactly reach it. The basal joint of the antennae is rather elongate and suddenly clavate, and the stalk is slender and smooth. It seems to walk badly and probably is nocturnal in its habits. It dodges rather clumsily about among the thorns of *Gleditschia triacanthos*, or from a hiding place under one piece of the scaly bark to another, and the larva mines the thorns of the *Gleditschia*.

My attention was first attracted to it by observing numerous empty pupa cases projecting from the large thorns, sometimes two or three from a single thorn, in the latter part of May. As *Gelechia* (*Helice*) *palidochrella* Chamb. was swarming around the trunks of the *Gleditschia* trees at the same time, I had little doubt that it was the thorn burrower; however, to make it certain, I gathered some of the thorns, and from them, to my surprise, bred a single specimen of *gleditschiælla*, a "micro" that I had never before seen, though I had captured multitudes of "micros" from the trunks of the same trees. Since then I have taken several specimens by frightening them from their hiding places among the bunches of thorns. I am, however, fully convinced that *palidochrella* also feeds in some way on *Gleditschia*, and I think that *Philonome Staintonella* Chamb. most probably does also, and likewise *Semele bifasciella* Chamb. If the latter does not feed on *Gleditschia*, it probably does on Elm.

L. gleditschiælla is dark glossy bronzy brown, tinged also with green in ordinary lights, appearing when the light falls on it golden bronze, in other lights showing purple or even bluish reflections. The anal tuft and rather elongate hairs of the posterior tibiae fulvous in the ♂, but darker in the ♀. *Al. ex.* $\frac{1}{2}$ inch. Kentucky.

An old or worn specimen is a very plain and unattractive insect, but a perfectly fresh specimen is a very fine and handsome one, notwithstanding that it is so nearly unicolorous: its perfect smoothness and gloss, fine scales, elongate wings and ciliae, and rich greenish brown, bronze and purple hues with the changes of light, make it a very handsome species.

The thorns of the *Gleditschia*, after being hollowed out by this larva, are frequently occupied by a small species of Ant.

When the account of this species was first prepared the larva was unknown, and until this spring (1876) I have had no opportunity of investigating its habits. I have found the larvæ of two species feeding

upon the pith inside the thorns of *G. triacanthos*; the one first described below I am satisfied is the larva of this species; what the other is I do not attempt to guess, but I append a description of it because of its singular structure.

That which I believe to be the larva of *Gleditschiæella* is about three lines long, rather fat and sluggish, yellowish white, with the head and a line which is interrupted in the middle, across the first segment after the head, just behind its anterior margin, ferruginous. Feet, sixteen. The pupa is not enclosed in a cocoon. I have found a few larvæ and several fresh pupæ in the latter part of April.

The other larva is white, about four lines long, cylindrical, with the segments distinct and clothed with scattered white hairs. The thoracic legs are very distinctly divided into segments, *have no terminal claw*, each segment being surrounded near its apex with a circle of rather stiff ciliæ; the anal feet are small and indistinct, and *there are no ventral prolegs*; *but there are six pairs of dorsal prolegs or large tubercles* which represent them; these "dorsal prolegs," if I may so call them, are as large and distinct as the true legs; they have no terminal claw, nor any coronet of tentacles, as in ordinary ventral prolegs, but each one is bifid at its tip, or to speak perhaps as correctly, each one ends in two small tubercles, and *progression is mainly effected by these false legs*. In crawling the thoracic and anal feet rest upon one surface, while the dorsal or false feet rest upon the opposite one, the body being curved so as to accomplish this purpose.

The larvæ of *Gleditschiæella* were found in living thorns, or those which had not been long dead; and a single larva evidently eats but little of the pith. The larvæ with the dorsal legs were found at the same time in dead thorns, which had previously been burrowed by the larvæ of *Gleditschiæella*, and in which was the small hole through which the imago of that species had emerged the previous year. No other means of ingress or egress was observed besides this hole, and this singular larva could not now pass through this hole. It was feeding on the dead pith. Small white silken cocoons, between three and four lines long, were found in some thorns; most of them were a year or more old, and were empty, but one of them contained a pupa which unfortunately was destroyed in opening the thorn. Several dead larvæ were also found, but they were so completely encased in multitudes of little Chalcid pupæ that it was impossible to determine the larvæ. A little Chalcid larva was just emerging from one of the larvæ of *Gleditschiæella*.

L. ænotheræsemenella. *N. sp.*

Antennae white; the basal joint of the outer surface of the second joint of the palpi, an annulus before the middle of the third joint, and its tip, brown (the third joint sometimes entirely brown). Head white. Fore wings sordid whitish, dusted and overlaid with pale fuscous, with four short longitudinal black lines along the middle of the wing, the first of which is on the fold before the basal fourth; the second is about the middle; the third is about the apical fourth, and the fourth is at the apex. These lines are made of raised scales. There are also two blackish raised tufts, one of which is just before the dorsal ciliae, and the other is a little further back. Hind wings fuscous. The first pair of legs is brown on the anterior surface and whitish behind, second and third pair whitish marked externally with brown. The black lines along the middle of the wing remind one somewhat of similar lines in the European *L. phragmitella*, and *L. cephalonthiella* Chamb. has similar lines. This species, however, is quite distinct from both. *Al. ex.* $\frac{1}{16}$ to $\frac{1}{8}$ inch. Sent to me by Miss Murtfeldt, from St. Louis.

(To be Continued.)

ENTOMOLOGICAL CLUB OF THE A. A. A. S.

We desire to call the attention of entomologists of the U. S. and Canada to the fact that the Entomological Club of the American Association for the Advancement of Science will meet at Buffalo, N. Y., on the 22nd of August, in some room that will be provided by the local committee of the Association. All interested in the subject of Entomology are invited to attend, and to repair at first to the Tiff House for instructions.

J. L. LeCONTE, Pres.

C. V. RILEY, Sec.

In view of the fact that questions of great importance relating to the present and future well-being of Entomology are likely to be discussed at the forthcoming meeting of the Entomological Club, we trust that all the "brethren of the net" who can possibly attend from Canada, as well as the U. S., will endeavor to be present.—ED. C. E.

BOOK NOTICES.

United States Geological Survey of the Territories, Vol. x. Monograph of the Geometrid Moths, by A. S. Packard.

Through the kind recommendation of Dr. Packard, we have been favored with a copy of the above work from the "Department of the Interior," at Washington. It is a quarto volume of over 600 pages, with 13 beautiful plates, 6 of which are devoted to delineations of the wing structure of the different families, 1 to the various forms of thorax, &c., and 6 to representations of the insects in their larval and perfect forms. Some idea of the work on these beautiful plates may be formed when it is stated that these latter six plates contain figures of 377 species of Geometrid Moths, besides 66 figures of the larvæ and chrysalids.

The plates illustrating the venation and external anatomy have been drawn by Mr. S. E. Cassino and Dr. Packard—the moths by Mr. L. Trouvelot, of Cambridge, Mass. They are all well executed, but Mr. Trouvelot's work is especially worthy of praise. The many and minute points of difference between the various species are faithfully given, so that the student, with the help of the excellent written descriptions in the text by Dr. Packard, will have little difficulty in determining the species in his possession.

This work is a most valuable contribution to our Entomological literature, bringing together all that is known up to the present time in relation to the Geometrids inhabiting this country north of the southern boundary of the United States, including British America, Arctic America and Greenland. It will give a great stimulus to the further study of this most interesting family of moths. The careful work of years of patient labor and research is evident throughout its pages, and we sincerely hope that its talented author may be spared many years to continue the work thus so well and thoroughly begun. This volume is beautifully got up—the paper and typography excellent, reflecting great credit on the department from whence it is issued, and on the United States government for their enlightened and liberal policy in thus placing in the hands of the scientific student, as well as that of the general public, the material accumulated by the untiring industry of the busy workers of the past, and diffusing a knowledge throughout the country in reference to these matters which could not otherwise have been accessible.

We tender our cordial thanks to Dr. Packard for his kind remembrance of us.

Eighth Annual Report of the Noxious, Beneficial and other Insects of the State of Missouri, by C. V. Riley, State Entomologist.

We are much indebted to Mr. Riley for a copy of this valuable work. It is got up in the usual excellent style of these Reports, 8vo., 190 p., illustrated with fifty-five excellent wood engravings.

The Report opens with some notes on the Colorado Potato Beetle, followed by articles on Canker Worms, the Army Worm, the Rocky Mountain Locust, the Grape Phylloxera and the Yucca Borer. These articles abound with practical information and suggestions, making the work a very valuable one to the intelligent agriculturist as well as to the entomological student. It would be difficult to estimate the immense good which these eight reports have accomplished, diffusing practical information of the greatest value to the farmer and fruit grower, as well as settling many scientific points of much interest to entomologists. The State of Missouri deserves great credit for her enlightened liberality in supplying the means to enable Mr. Riley to devote himself entirely to this good work, and we believe it will abundantly repay its cost to the State itself in a material way by the saving of grain and fruits from insect destruction, while at the same time it disseminates a knowledge on the subjects treated of over the entire length and breadth of the land.

On Some Insect Deformities, by Dr. H. A. Hagen. Memoirs of the Museum of Comparative Zoology at Harvard College, Cambridge, Mass., 4to 24 p., with one lithograph plate.

Through the kindness of Prof. Agassiz and Dr. Hagen, we have received a copy of the above interesting paper, in which the following subjects are treated of: Perfect Insects with the Larval Head, and Precocious Development of the Caterpillar.

Synonymic List of the Butterflies of America, North of Mexico, by Samuel H. Scudder, Cambridge, Mass., from the Bull. Buf. Soc. Nat. Sci., 8vo., 32 pp.

Fossil Foraminifera of Sumatra, by Henry B. Brady, F.R.S., F.L.S., &c., 8vo., 8 pp., with two excellent lithographic plates. From the Geological Magazine, London, Eng.

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INQUIRIES CONCERNING THE GENERA OF MR. SCUDDER'S "SYSTEMATIC REVISION."

BY S. H. PEABODY, CHICAGO, ILL.

Soon after the issue of the "Systematic Revision," and while I was trying to master the intricacies of its analysis, it occurred to me to tabulate the generic descriptions in some family, if, haply, I might thus discover the exact points of discrimination. By chance I took first the tribe *Adolescentes*, producing the table which accompanies this paper. In this table, if any expression or word which could distort the obvious meaning of the author, has been omitted or wrested from its proper connection, such change has been through inadvertence or mistake. In like manner I have tabulated the *Dryades*, the *Hamadryades*, the *Equites*, the *Voracia*, the *Fugacia*; I confess that when I came to the work of comparing phrase by phrase the five page descriptions of the genera *Papilio* and *Aglais*, my heart failed me. I resolved to wait until my unfledged pinions were equal to these lower and briefer flights of the scientific imagination before attempting this more extended journey.

In view of the introductory passages of the "Revision" which promised to remove "the reproach of *Lepidopterists*," it was with no little concern that I found my tables "insufficient"; that I was unable to distinguish the differences between the genera grouped in the *Adolescentes*, or the *Equites*, or the rest. I have waited now nearly four years for some Philip to say "understandest thou what thou readest?" and to give such elucidation that I could go on in joyful belief. No such apostle of the new-antique has appeared, and I venture to offer this table, with a few thoughts, to my entomological brethren.

The analyses of these generic descriptions show two items: First, that many of the differences expressed exist only in the phraseology, either indicating no differences, whatever, in fact, or differences so slight as to be purely opinionative; second, that other differences are such that they

may be positively formulated, often numerically stated. For the present, we will admit that these differences, thus accurately expressed, do really exist, and depend upon measurements which may be repeatedly verified.

With the first of these items we need do little more than present a few illustrations; the array in parallel columns will usually bring them into sufficient prominence. The second is of more consequence, for it raises the important question upon which this whole discussion will turn—Are these differences of such a character as will warrant the erection of distinct genera? Mr. Scudder has already answered this question in the affirmative; for us to answer blankly in the negative would be to pit our opinion against his, in which case the weight of authority would very largely and very properly lie on his side.

We must, therefore, briefly inquire into the distinctions which exist between genera and species, as found in law and in usage.

Probably we can appeal to no higher authority upon the law than that of Agassiz, and accordingly we quote his definitions as found in the "Essay on Classification."

"Genera are most closely allied groups of animals differing neither in form nor in complication of structure, but simply in the ultimate structural peculiarities of some of the parts." Eng. Ed., p. 249.

"Genera [are] characterized by ultimate peculiarities of structure in the parts of the body.

"Species [are] characterized by relations and proportions of parts among themselves, and of the individuals to one another and to the surrounding mediums." P. 265.

Here the question turns upon the force of the words "ultimate structural peculiarities." Can they mean that any difference which can be formulated in the ratio of length to breadth in the same part, or of length of one part to length of another part, is a difference of ultimate structure? If one insect has its fore-tibia five-sixths the length of its fore-femur, while another has the same parts in the ratio of four-sixths, or six-sixths, are they for this cause of different genera? Does this principle extend through zoology? Is Gen. Sheridan, who is short and stout, and who, according to Pres. Lincoln, can scratch his ankle without stooping, generically different from Gen. Sherman, who is tall and slender, and whose ankles are evidently out of his reach? Can any one safely affirm of any individual of any species of any genus in the whole realm of nature, that all its ratios of measurement in all its members are identical

with the corresponding ratios of any other individual existing? There must be a limit to the meaning of these words, or we shall find a genus wherever we find the slightest variation in ultimate structure, that is, a genus for every species, not to say for each individual. An examination of the "Revision" would lead us to suppose that the classification of Butterflies is rapidly drawing to such a condition. When it comes to that, and when each species is the "type" of a distinct genus, what office will remain for genera?

But the other or co-ordinate section of the law distinctly bars this manifestly absurd interpretation of the first section, by making species depend, so far as difference of parts is concerned, upon such differences as involve only the "relations and proportions of parts among themselves." The femero-tibial ratios of five-sixths and six-sixths, for example, are clearly differences of proportion of parts among themselves, and therefore under the law, these differences are not of generic, but only of specific, value.

That this view accords with usage may be abundantly illustrated in every department of Entomology, not forgetting the writings of Mr. Scudder. In a single genus of Coleoptera, lately revised by Dr. Horn, we find assembled species with "thorax broader than long" and "thorax longer than broad"; with antennæ "short" and antennæ "longer than head and thorax"; form "slender," form "broadly oval"; "with wings" and "without wings." In a single genus of Orthoptera Mr. Thomas includes species "with elytra" and "without elytra"; pronotum cylindrical or carinated; antennæ very long or of ordinary length; wings absent or present. In Mr. Scudder's Revision of Crickets will be found tables of measurements of individuals of the same species, in which the ratios differ much more than those in the table of *Adolescentes*, upon which he bases distinctions of genera. In Dr. Packard's Monograph of the *Phalænidæ* he includes in the genus *Thamnonoma* species which have the palpi very long, and palpi short; in *Aplodes* species which have the first median venule remote from second, and which have the first and second median and posterior discal venules co-originating; in *Tephrosia* species which have hind tarsi longer than tibia, and hind tarsi shorter than tibia. In the "Revision" itself, Mr. Scudder admits a variation of 41 to 49 joints in the antennæ of different species of the genus *Argynnis*; it seems, however, that the elastic band which stretches so far would not endure three degrees more of straining to include the antennæ of *Speyeria* with their 52 joints.

ANALYSIS OF GENERIC DESCRIPTIONS OF THE TRIBE ADOLESCENTES.

Genus.	LYCÆIDES.	GLAUCOPSYCHE.	CYANIRIS.	EVERES.
Head	Small.	Small.	Small.	Small.
Front	Flat. Very slightly tumid beneath; scarcely surpassing front of eyes, fully as broad as they. Scarcely half as high again as broad.	Nearly flat. Below considerably tumid; as broad as the front view of the eyes. Scarcely half as high again as broad.	Flat. Very slightly fullest below; barely surpassing the front of eyes. Scarcely twice as high as broad.	Nearly flat. A very little bulbous below; barely protruding beyond front of eyes. Scarcely $\frac{2}{3}$ as broad, &c. Twice as high as broad.
Eyes	Naked.	Delicately and sparsely pilose with very short hairs.	Delicately and sparsely pilose with short hairs.	Naked.
Antennæ	Scarcely longer than abdomen.	Considerably longer than abdomen.	Slightly longer than abdomen.	Barely longer than abdomen.
No. joints in	About 32.	About 31.	About 34.	About 32.
Do. in club.	12 or 13.	12.	12 or 13.	12.

Palpi	Slender. Nearly or quite twice as long as eye.	Slender, compressed. Scarcely more than half as long again as eye.	Slender. Scarcely more than half as long again as eye.	Slender. Less than twice as long as eye.
(as the Nos.	2—	$1\frac{1}{2} +$	$1\frac{1}{2} +$	2—)
Ratio of fore tibia to hind	A little more than $\frac{5}{8}$.	$\frac{2}{3}$	A little more than $\frac{3}{8}$.	$\frac{3}{4}$
(as the Nos.	$.6\frac{1}{4}$	$.6\frac{2}{3}$.6 +	$.7\frac{1}{2}$)
Ratio of mid tibia to hind	Scarcely $\frac{1}{4}$	$\frac{5}{8}$	Nearly $\frac{5}{8}$	A little shorter.
(as the Nos.	.8—	$.8\frac{1}{3}$	$.8\frac{1}{3}$ —	.9 or 1.0)
1st Sup'r Br. of subcostal nerve of fore wings arising	In the middle of the outer two-thirds of the upper border of the cell.	Somewhat beyond middle of upper border of the cell.	At scarcely two-thirds the distance from the base to the apex of cell.	A little beyond the middle of the upper border of the cell.
2nd do.	Midway between it and the origin of 1st inferior subcostal nervure.	Midway between this & the origin of first inferior branch.	At less than half way between.	About one-fourth the distance from origin of first to apex of cell.
Cell	Somewhat more than $\frac{1}{2}$ as long as wing.	Somewhat more than $\frac{1}{2}$ as long as wing.	$\frac{1}{2}$ as long as wing.	Scarcely $\frac{1}{2}$ as long as wing.

Let us now examine the table of the *Adolescentes*, searching for these ultimate peculiarities of structure, not simply differences in the proportions of parts among themselves, which furnish the authority for constructing four genera where entomologists have usually found but one.

After observing the sameness in size of head and flatness of front, we meet at once differences which seem to consist in merely varied forms of phraseology. For what else can we make of these? "Front very slightly tumid beneath"; "below considerably tumid," "very slightly fullest below"; "a very little bulbous below." "Scarcely surpassing, barely surpassing, barely protruding beyond the front of the eyes." What may be the relative weight of the four discriminating words "scarcely, considerably, slightly" and "barely," which state how much the antennæ are longer than the abdomen? Does the ascending scale begin with barely and end with considerably? If so, how do we grade the slightly and scarcely? If these words do not express differences, why use them? If they do, is the difference more than a very small difference in the proportion of parts? What shall we say of these phrases which ring the changes upon the devoted fronts of the *Equites*? They are said to be "scarcely higher than broad," "fully as broad as high," "scarcely broader than high," "of about equal height and breadth," "fully as high as broad." In the *Hamadryades* we find yet other variations: "Scarcely as broad as," "somewhat narrower than," "not nearly as broad as," "about three-fourths as broad as." Whoever will take the trouble to develop one of these analytical tables will find abundant illustrations of this nature; we believe that Mr. Scudder himself would be surprised at the marvellous facility with which he has escaped saying the same thing twice in the same way.

The numbers of joints in the antennæ scale like a flight of steps. "About 32" must include as possible at least 31 and 33, unless we reckon like that Massachusetts pauper, who being asked how many were there in the poor house, answered "Between eight and nine of us!" Then we have this ladder:

Cyaniris,	33, 34, 35.
Lycæides and Everes,	31, 32, 33.
Glaucopsyche,	30, 31, 32.

The whole range has but four usual and six possible terms.

The palpi are "scarcely more than half as long again as the eye," "less than twice as long as the eye," or "nearly or quite twice as long as the

eye." Is the difference between the first and second of these as great as that between sharp six and flat seven of the musical scale?

The ratios said to exist between the lengths of fore, middle and hind tibiae, are expressed definitely in numbers. If we reduce the fractions to common denominators in the usual way, that we may compare their numerators, we find the terms so large as to be unweildy. Let us change the fractions to tenths; the resulting numbers are, for ratios of fore tibiae to hind tibiae, $.6\frac{1}{4} +$, $.6\frac{2}{3}$, $.6 +$, and $.7\frac{1}{2}$; for middle tibiae to hind tibiae, they are $.8$, $.8\frac{1}{3}$, $.8\frac{1}{3} -$, $.9$ or $1.0 -$. The entire range of variation is less than one and one-half tenths in the first case, less than two-tenths in the second case. The difference between first and third, first series, is one-fortieth; between first and second is one-twenty-fourth. Are these differences, or even the sum of them, ultimate peculiarities of structure?

One item remains, the venation of the wings. The first superior branch of the subcostal nervure arises "in the middle of the outer two-thirds of the upper border of the cell"—is there any circumlocution in this?—"somewhat beyond the middle of the upper border of the cell," "at scarcely two-thirds the distance from the base to the apex of the cell," "a little beyond the middle of the upper border of the cell. In fractions, $\frac{2}{3}$, $\frac{1}{2} +$, $\frac{2}{3} -$, $\frac{1}{2} +$.

How, then, does *Lycæides* differ from another, *Glaucoptysche*, for instance? 1. Its eyes are naked rather than delicately and sparsely pilose with very short hairs. 2. It has about 32 rather than about 31 joints in its antennae. 3. Its palpi are a little less than twice, rather than a little more than one and a half times, as long as the eye. 4. The ratio of fore tibiae to hind tibiae is $\frac{1}{2}\frac{1}{4}$ rather than $\frac{1}{2}\frac{1}{2}$. 5. That of middle tibiae to hind tibiae is $\frac{2}{3}\frac{1}{3}$ rather than $\frac{2}{3}\frac{2}{3}$. 6. The 1st sup. branch of subcostal nervure arises at $\frac{1}{3}\frac{1}{2}$ rather than at $\frac{1}{2}\frac{1}{3}$ the length of the cell. Upon which of these six points rests the distinction between these genera? Will the integration of all these differentials with whatever may be implied in the shades of meaning between scarcely and barely, considerably and slightly, suffice to make a gross sum which amounts to more than a difference in the proportions of parts properly accounted for as specific? Why may not these find ample room and exact determination in the same genus? Any other of the six pairs which these four names would make, if taken two by two, gives a series of differences of the same nature and of equal weight. The discussion of any other of the tables which lie before us leads to conclusions equally forcible and equally direct. In this resuscitation of

proposed and forgotten genera, this subdividing and limiting of the old and this erection of new, the same method seems to have been followed. There is the same microscopic search for minute differences, the same confusion arising from the use of fractions of different denominators, by which the real amount, or want, of difference evades the understanding, the same felicitous escape from repetition.

If the case is not as we have stated, will some one show wherein? If it is, ought these genera to stand?

Is any genus valid, until it has been substantiated by a full and competent description which shall clearly set forth the points of discrimination between it and other genera, particularly that from which it has been separated?

While the mention of some species in a genus as a type of that genus may be useful as giving a nucleus about which that genus may crystallize, thus providing for future definiteness and fixity, it seems to us that we ought most earnestly to protest against the establishment of a genus by the mere mention of its type. For example, admitting that there is ground for the use of Hübner's name *Epargyreus*, what is the distinction between it and the proposed new genus *Achalarus*? It is not enough to answer, perhaps no one is disposed to say, "One skilled in this branch of Entomology will know." The question should be answered for the benefit of the unskilled, the learner. Nor is it enough to say—"We have no space to answer now; we want time for investigation; we will answer hereafter." We believe there are no pre-emption laws in Entomology; that no caveats can be filed at this Patent Office. The laws of priority can cover only so much as one has wrought out and published, not what he gives notice that he expects to find, or intends to publish in the future.

NO. OF BROODS OF *DANAIS ARCHIPPUS*.—There positively are three broods of *archippus* here, at least. The second is now giving butterflies. I set a female last week and she laid eggs. I saw a chrysalis last week and for several days have seen newly emerged butterflies. The first brood emerged early in June. Very late in the season is a third brood, Sept. or Oct., and these hybernate as butterflies.—W. H. EDWARDS, W. Virginia.

August 4th, 1876.

DESCRIPTION OF A NEW SATURNIAN.

BY JAMES BEHRENS, SAN FRANCISCO, CAL.

Saturnia (Aglia) Mendocino, n. sp.

The new species is somewhat related to *S. hera*, the brier-feeding *Saturnia (Eglanterina)* Bdv.)

Habitat—The forests of *Sequoia Sempervirens*, of the Coast range of Mendocino County, Cal.

Time of Flight—June, July.

Description from a male—no females as yet taken.

Expanse of wings, $2\frac{1}{2}$ inches ; of body, $\frac{3}{4}$ inch.

Antennae of ♂ broadly feathered, of same reddish brown color as anterior wings.

Head darker than wings.

Prothorax with a narrow transversal white band, and this white band lined with an equally narrow black band. Thorax color of anteriors.

Thorax beneath, and legs and feet, of a beautiful cherry red.

Abdomen above dark, with yellow rings, corresponding with color of posterior wings ; beneath colored like feet and thorax beneath.

Anteriors above smoky reddish chocolate. The usual eye, which is small, leans towards the base of wing on a squarish white field, which white does not appear on under side of wings ; the eye itself is distinct below and fully as perfect as above, showing the yellow and blue and black iris. The apex of anteriors colored scarlet (not orange), narrowed in by a slight band of black, which black band is lined on both sides with a faint blue line. No signs of this apical ornament beneath.

Anteriors beneath ochre yellow, nearly as brilliant as posteriors above. Inner margin very dark ; the eye as mentioned previously ; the apex widely obfuscated.

Posteriors above of a bright yellow, marked by the usual eye, same as that of anteriors, but without any white disk or field. A dark obfuscation from the base. A distinct, comparatively broad, black band (with veins slightly marked) towards outer margin, leaving the margin bright yellow. Fringes somewhat deeper shaded, yellow.

Posteriors below unicolorous, of about same reddish fuscous as anteriors above, with but a reflection of the eye or band of upper surface.

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

(Continued).

92. *Omophron SAYI* Kby. is *AMERICANUM* Dej.
93. *Haliphus impressus* Latr., erroneously determined, is *RUFICOLLIS* De Geer.
94. *Hydroporus nigrolineatus* Steph. Not known to us. Is the identification correct? *
95. " *parallelus* Say.
96. " *LAEVIS* Kby. This and the preceding seem to me to be merely varieties of *catascopium* Say, which Crotch says is *GRISEOSTRIATUS* De Geer.
97. " *PICATUS* Kby.
98. " *SIMILIS* Kby. is *IMPRESSOPUNCTATUS* Schall. (fide Crotch).
99. *Laccophilus BIGUTTATUS* Kby. is *PROXIMUS* Say.
100. *Colymbetes SEMIPUNCTATUS* Kby. is a *GAURODYTES*.
101. " *BICOLOR* Kby. A *GAURODYTES*.
102. " *PHAEOPTERUS* Kby. is probably *GAURODYTES obliteratus* Lec.
103. " *BIFARIUS* Kby. Placed by Crotch in a new genus, *ILYBIOSOMA*.
104. " *RETICULATUS* Kby. is probably identical with *GAURODYTES ARCTICUS* Payk.
105. " *PICIPES* Kby. is an *ILYBIUS*.
106. " *ASSIMILIS* Kby.
107. " *TRISERIATUS* Kby. is *SCULPTILIS* Harris.
108. " *RUGICOLLIS* Kby. is *GRAPHODERES LIBERUS* Say.
109. " *MACCULLOCHII* Kby. is *ACILIUS MEDIATUS* Say.
110. *Dytiscus OOLIGBUKII* Kby. is *CONFLUENS* Say.
111. " *HARRISHII* Kby.
112. " *FRANKLINII* Kby. is *CONFLUENS* Say, *var.*

* Dr. David Sharp, of Scotland, is now preparing a monograph of the *DYTISCIDAE* of this world; and by means of typical specimens from Dr. Leconte and myself, will settle definitely the synonymy of all of Kirby's species in this family.

113. *Cyclinus ASSIMILIS* Kby. is *DINEUTUS AMERICANUS* Linn.
114. *Gyrinus IMPRESSICOLLIS* Kby. I think the reference to *BOREALIS* Aubé is correct.
115. " *aeneus* Leach (Kby.) Kirby's determination is probably incorrect.
116. " *VENTRALIS* Kby.
117. " *ANALIS* Kby. Impossible to identify this species. The name is preoccupied. It is not Say's *ANALIS*.
118. " *minutus* Fab.
119. *Paederus riparius* Fab. (Kby.) is *LITTORARIUS* Grav.
120. *Lathrobium PUNCTICOLLE* Kby.
121. " *GRAVENHORSTI* Kby. is *CRYPTOBIUM PALLIPES* Nord.
122. " *bicolor* Grav. is a *CRYPTOBIUM*.
123. *Gyrohypnus ASSIMILIS* Kby. is *XANTHOLINUS CEPHALUS* Say.
124. *Olophrum MARGINATUM* Kby. is an *OMALIUM*.
125. *Alaenchara PALLITARSIS* Kby. is a *HOMALOTA*.
126. *Tachyporus ACUDUCTUS* Kby. is *COPROPORUS VENTRICULUS* Er.
127. " *AFFINIS* Kby.
128. *Philonthus politus* Linn. (Kby.) is *AENEUS* Rossi.
129. " *MANDIBULARIS* Kby. Male of *AENEUS*.
130. " *PICATUS* Kby. is *BRUNNEUS* Grav.
131. " *fulvipes* ? Grav.
132. *Staphylinus CHRYSURUS* Kby. *LEISTOTROPHUS CINGULATUS* Grav.
133. *Creophilus villosus* Grav.
134. *Necrophorus velutinus* Fab. *N. TOMENTOSUS* Weber is an older name.
135. " *HEBES* Kby. is a variety of *VESPILLOIDES* Herbst.
136. " *OBSCURUS* Kby. is the *Melsheimeri* ‡ Lec.
137. " *MELSHEIMERI* Kby. Occurs also in Alaska and is *maritima* Mann.
138. " *HALLII* Kby. is *ORBICOLLIS* Say.
139. " *PYGMAEUS* Kby. is *VESPILLOIDES* Hbst.
140. *Necrodes surinamensis* Fab. is *SILPHA SURINAMENSIS*.
141. *Oiceoptoma marginale* Fab. An older name is *SILPHA NOVEBORACENSIS* Voet.
142. " *lapponicum* Linn. is *SILPHA LAPPONICA*.
143. " *TRITUBERCULATUM* Kby. is a *SILPHA*.
144. " *inaequale* Fab. is *SILPHA INAEQUALIS*.

NOTES ON GEOMETRIDÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Endropia serrata Grote & Robinson, Trans. Am. Ent. Soc., p. 88 (July, 1868).

Geometra serrata Drury, Ill., 1, 40, pl. 20, fig. 4 (1770).

Ennomos concisaria Walk., Part xxxv, 1551 (1866).

Endropia serrataria Pack., 517, pl. 12, fig. 25 (1876).

Northern Illinois, June 25, Dr. Wm. A. Nason. This species seems to range from the Eastern and Middle States to Nebraska, according to Dr. Packard.

Lythria chamaechrysaria.

Mellila chamaechrysaria Grote, Bull. Buff. Soc. Nat. Sci., 1, 13, pl. 1, figs. 1-3.

Lythria rilevaria Pack., p. 221, pl. 9, fig. 43.

I do not see any reason for not uniting these species; my illustration has apparently been overlooked by Dr. Packard.

Selenia Kentaria Grote & Robinson, Trans. Am. Ent. Soc., 1, 359, 1865.

Pericallia Kentaria G. & R., iv., 1, 12, figs. 5-6 ♀, 1867.

It is compared by us with the European *Selenia illunaria*, but our material of the latter was erroneously determined, hence the mistake in the generic name afterwards corrected by ourselves.

Tetracis lorata Grote, Proc. Ent. Soc. Phil., 3, 91, 1864.

Dr. Packard has overlooked the original citation to this species.

Lobophora fusifasciata Walk., C. B. M., Part 24, 1258 (1862).

Larentia longipennis Walk., Part 35, p. 1671 (1866).

Scotosia lobophorata Walk., 25, 1347 (1862).

Lobophora vernata Pack., 5th Rep. Peab. Acad. Sci., 57 (1873).

Lobophora vernata Pack., Phal., 183, pl. 8, fig. 13 (1876).

Eupithecia fusifasciata G. & R., Trans. Am. Ent. Soc., 2, 82 (1868).

On my visit to the British Museum specimens of this species were registered under different names, the first of which should, I think, stand for the species.

Lobophora atroliturata Walk., C. B. M., 25, 1710 (1862).

Eupethecia geminata Grote, Proc. Ent. Soc. Phil., 6, 29, pl. 5, fig. 6 (1866).

Lobophora geminata Pack., Phal., 184, Plate 8, fig. 14 (1876).

Eupithecia atroliturata G. & R., Trans. Am. Ent. Soc., 2, 83 (1868).

Fresh specimens are green tinted, when faded become yellow, then probably white as described by Professor Packard, who overlooks, apparently, our synonymical reference based on an examination of the British Museum collection.

Choerodes Gueneé.

This generic name must, I think, stand. The type of *Eutrapela* is the European *lunaria*. The question as to the generic distinction of *clemitaria* does not interfere, for if it is ultimately separated, it must receive a distinct name. Gueneé used *Eutrapela* Hübn. ex. Verz.

The species not referred to *Choerodes* as yet are, apparently, *C. falcata* (Pack.) and *C. fusciferata* (Pack.)

Eutrapela Hübn., Tent.

The type of this genus being the European *lunaria*, our two North American species *Eutr. Kentaria* (G. & R.) and *Eutr. alciphearia* (Walk.) must be referred to it.

Ennomos Treits.

The term *Eugonia* Hübn. is pre-occupied in the butterflies. I had proposed *Eriplatymetra* for *coloradaria* and *angularia*. According to Dr. Packard (I have no specimens) my *coloradaria* is a *Tetraxis*.

Eubyja paenulataria (Grote), Proc. Ent. Soc. Phil., 2, 31, pl. 2, fig. 3 (1863).

This species is omitted by Dr. Packard. I think his specimen from Dr. Perley (p. 413) may belong here. I believed to identify the ♂ *E. quernaria* in coll. Mr. Saunders, but have now no specimens of this or *paenulataria* or *cupidaria* to compare.

Endropia Warneri.

Endropia Warneri Harvey, Bull. Buff. Soc. Nat. Sci., 2, 121 (1874).

Endropia apiciaria Pack., Phal., 502, Plate 12, fig. 9 (1876).

It is doubtless by an unintentional oversight that Dr. Packard has re-described this species.

Brotis vulneraria Hübn., Zutr.

A drawing, which I recognize as of this species, has been shown me by Prof. Hinsdale, of Racine, Wis., where the original was taken. Hübner describes the species as from Bahia. I would not refer it to the Geometræ but to the Noctuæ (Fasciatæ).

Plagodis Kentzingi Grote.

Dr. Packard changes the termination of the specific name. I do not think that anything is gained by the addition of *aria* or *ata* to the specific names in this group; and I think there is every reason why the specific name should be left as written by the original author. And why, *in the same genus*, some names should stand with *aria* after them and some with *ata*, I cannot see (e. g. *Semiothisa*). If *Eud. serrata* should have a different termination on account of the pectinated antennae of the male, it should be *serraria*, one would think, and not *serrataria*. Since the limit between feathered and simple antennae is very difficult to draw, the correct application of these terminations is nearly impossible.

NEW NOCTUIDÆ.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Mamestra orobia, n. s.

Eyes hairy; antennæ pectinate. Thorax and wings grayish fuscous, color of *trifolii*; basal half line white, t. a. line geminate, widely separated; t. p. line consisting of a series of white points; subterminal irregular, terminal line black. Orbicular spot large, white ringed with dark centre; reniform constricted at the centre, white margined with a dark filling. Subterminal space shaded light. Beneath of a lighter shade, discal spot and a faint trace of the t. p. line. Secondaries shining fuscous, fringes whitish, beneath lighter, discal spot black, very evident. Expanse 20 m. m. Texas (O. Meske).

This species is allied to *trifolii*. The antennae are pectinate, whilst in *trifolii* they are simple. In *orobia* the darker costal edge shows the white dots distinctly.

Gortyna appassionata, n. s.

Antennae simple, base white. Thorax and wings of a dark red color, thorax tufted, basal half line yellow, 3-shaped, enclosing one large and one small yellow spot; exterior to the line a white dot. T. a. line inaugurated by a yellow dot on the costa, irregular, broken yellow; t. p. line geminate, inaugurated same as t. a. line, regularly waved; s. t. line faintly marked. Orbicular nearly round, white; reniform ovate, broken into many white spots by the red stains on the veins, with two perpendicular lines making a centre filled with yellow. Claviform sub-quadrate, bi-lobed, white, red margined; median space between the spots concolorous, below bright yellow, broken into sub-quadrate spots by the narrow median shade line and the red stained veins; terminal space glistening red, subterminal space wide, concolorous purple. The ground color appears as yellow spots in the median space near the costa; fringes concolorous. Beneath lighter than above, glistening, the arcuated line apparent in both wings; inferior wings pale, fuscous stained, with purplish fringes concolorous. Expanse 35 m. m. London (F. B. Reed).

Perhaps the most brilliantly marked species of the genus. It is allied to *nitela*, differs from it by the wider, rounder reniform, the three larger superposed spots on the t. a. line, the wider concolorous subterminal space and the more regular lunulate t. p. line.

Homoptera stylobata, n. s.

Costal margin straight; wings slightly dentate. Fore wings blackish shaded with whitish on the t. a. line and on median space behind over the reniform. Lines black, distinct, perpendicular, t. p. line squarely exerted opposite the cell around the reniform. An interrupted black line before the margin. Fringes cut with whitish opposite the interspaces. Hind wings blackish with obsolete lines; the dotted line before the margin continued. Fringes mostly whitish. Beneath grayish with double distinct common blackish shade bands. Abdomen stout, tufted. Expanse 39-40 m. m. Texas (Belgrave, No. 170). Several examples.

Homoptera mima, n. s.

Allied to the preceding, but smaller, without the whitish shades on fore wings. Reniform with a few white scales. Lines black; sinuate

t. p. line distinct, even, exserted opposite the cell. Hind wings pale, ashen, with median line and ashen fringes; fore wings with blackish fringe, narrowly cut with pale. Beneath yellow, whitish, black speckled, with common line and black discal points. Expanse 33 m. m. Texas (Belfrage, No. 73). One specimen.

These two species differ by their nearly entire wings and by the obsolescent markings on hind wings, which do not agree with the primaries as strongly as usual. I do not see differences on which to separate them generically.

NEW PYRALIDES.

(II).

BY A. R. GROTE, BUFFALO, N. Y.

Emprepes novalis, n. s.

Fore wings whitish yellow and olive brown. The median field whitish yellow except a costal blotch of the darker tint. Base narrowly whitish yellow, succeeded by an oblique olive brown band. The outer line bordering the median space is nearly upright, a little irregular and slightly notched opposite the cell and again at internal margin. It is followed by the broad olive brown subterminal space. The subterminal line is yellowish, brought near the margin, flexuous, and the veinlets on the terminal space are marked with yellowish. Hind wings unicolorous fuscous. Beneath the terminal portion of both wings is fuscous, neatly and evenly limited from the pale basal portions. Legs pale; thorax somewhat yellowish. Expanse 16 mil. Texas (Belfrage, No. 403, Oct. 7); Bastrop Co. (Mr. Meske); Zeller, No. 385.

Botis octonalis.

Orobaena octonalis Zell., Beitr., 2, 11, Taf. iii, fig. 7.

Botis sexmaculalis Grote, Can. Ent., 8.

Texas (Boll in Mus. C. Z.) Kansas, Prof. Snow. The maxillary palpi are stated by Zeller to be probably wanting and the location of the species uncertain. I have only a single imperfect specimen before me.

The palpal structure is said by Prof. Zeller to be like that of *Orobaena*. I do not know any of the species which the Professor includes under that generic name.

Mesographe stramentalis Hübn., Zell. Beitr., 1, 74.

This species and its varieties are described by Prof. Zeller, l. c., who considers the European and American specimens to belong to one species. It is not rare in New York State. I have it from Long Island (Tepper); Albany (Lintner); Buffalo. Perhaps this is the *Pionca cunusalis* of Mr. Walker.

Mesographe rimosalis.

Pionca rimosalis Guen., 371.

Taken by myself in Alabama. One specimen (No. 2) sent me by Mr. Fred. Tepper, from Long Island.

Eurycreon sticticalis (Linn.)

Algonquin, Illinois, June 16, Dr. Wm. A. Nason. A specimen sent to Prof. Zeller could not be distinguished by him from the European species.

Zinckenia perspectalis (Hübn.)

New York State and Texas (Belfrage, No. 401, Nov. 22).

Mochlocera Zeller (n. g.)

♂. Eyes naked; antennæ ciliate beneath, brush-like; labial palpi curved upwards across the front, pointed; two very long, thickly scaled rigid processes extend from the base of the antennæ for about one-half the length of these latter, ascending from the inside of the scape and widening towards their tips, where they are heavily scaled. These processes might be taken for the labial palpi at first sight. The neuration has not been examined. I have seen three male specimens. The genus is allied to *Tetralopha* Zell.

Mochlocera Zelleri, n. s.

Fore wings divided into three fields by the median lines. Inner line defining outwardly the blackish basal space, black, with a slight median notch, nearly perpendicular, followed by a white shade. Median space shaded with white, with a short black discal streak. Outer line very finely denticulate, exserted opposite the cell, arising at apical third, black, run-

ning inwardly below median vein and narrowing the median space thence to internal margin. Terminally the wing is black. A broken black line at base of fringe. Hind wings blackish. Beneath pale blackish with common shade band and black point on disc of hind wings. Expanse 25 mil. Texas (Belfrage, No. 420, April 30); Zeller (No. 378 *mihi*); Missouri (Prof. Riley, No. 69).

Zophodia dentata Grote.

I have described this species in a paper prepared for Prof. Hayden's Reports. It is larger than *Bollii* Zell., and is at once distinguished and sufficiently characterized by the very deeply and acutely dentate outer line of the fore wings, which arises near the apices and sweeps inwardly to the discal point, thence in a succession of acute and deep inflections accompanied by gray or whitish shades. The species is more blackish than the Texan, the interior line single and more widely produced. One specimen from Clear Creek Canon, Colorado.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

LAVERNA.

L. bifasciella. *N. sp.*

Palpi with the outer surface of the second joint dark bluish brown or blackish, dusted sparsely with white, the inner surface being white dusted with blackish scales; third joint blackish. Head and tongue white, the vertex with a faint purplish tinge, and dusted with dark brown. Thorax very pale ochreous and white, dusted with blackish scales, and with the anterior margin shining black. Antennae dark brown, the basal joint somewhat silvery towards the tip. Primaries dark brown, in some lights bluish black dusted with white, and the dorsal margin with some dark dusting, from the base to the last fascia, which is just before the ciliae; the base is white faintly tinged with pale ochreous; a little before the

middle is a rather wide fascia of white and dark brown scales mixed, the dark brown hue prevailing near the costa, where the white is very narrow, while the white prevails towards the white dorsal margin; there is an obliquely transverse spot or ridge of raised dark scales about the middle of the wing, beginning on the costa and margined before with white, and before the ciliae is an oblique white fascia nearest the base on the costal margin. Ciliae of a sordid hue, dusted with white. *Al. ex.* $\frac{7}{8}$ inch. Received from Mr. Behrens, of San Francisco, Cal.

L. unifasciella. *N. sp.*

Allied to *L. Murtfeldtella* Chamb. and the preceding species, and to *L. propinquella* Stainton, but still more nearly to *L. decorella* Steph. The single specimen before me has the palpi broken off.

Head white dusted with purplish brown scales on the vertex, and all the brown parts of the insect have something of a bluish or purplish gloss. Antennæ brown. Upper surface of the thorax brown anteriorly, passing backwards into white at the apex. Fore wings brown dusted with white scales, the white increasing in quantity in the apical part of the wing. There is a large white spot on the base of the dorsal margin, as in *Murtfeldtella* and *propinquella*, not quite crossing the wing, and separated, as in those species, from the white spot placed a little further back, which in *decorella* is connected with the spot at the base; this and the absence of the white spot within the costal margin, are the most obvious points in which this species differs from *decorella*. Behind the basal white spot in this species is an ochreous streak in the brown and which ends at the second white spot or patch, which, as just stated, is continuous with the basal one in *decorella*; this white spot nearly crosses the wing in this species, but does not quite reach the costa, and is dusted with brown and contains on the fold a short dark brown line of raised scales, as in *decorella*, and which is bordered on the costal side by a small ochreous spot; thence to the fascia the wing is dusted with white scales and streaked about the fold with ochreous. The white fascia is placed just before the ciliæ as in *decorella*, and is oblique, being nearer to the base on the dorsal than on the costal margin, and before it the wing is more dusted with white and not so strongly marked with ochreous as in *decorella*, and so it likewise is behind the fascia, though both before and behind the fascia there is a distinct small ochreous spot or streak within the dorsal margin. There is a row of dark brown spots around the apex. (This may represent a hinder marginal line, as the ciliæ are injured.)

Abdomen brown on the upper surface, the under surface and tuft silvery whitish. Legs brown, tarsi annulate with white. *Al. ex.* $\frac{3}{8}$ inch. Behrens, San Francisco.

NEPTICULA.

N. badiocapitella. *N. sp.*

Vertex rusty or reddish brown; face a little paler or more reddish; palpi silvery; eye caps silvery white; antennae brown. Thorax and patagia white. Fore wings dark iron gray with a white fascia about the middle, the fascia irregularly outlined and wider on the dorsal than on the costal margin; at about the apical fourth are a costal and opposite dorsal white spot, distinct and rather large, which are sometimes faintly connected or nearly so, forming a linear fascia deeply concave towards the base; ciliae white; legs yellowish, except the anterior surface of the first pair, and the outer surface of the hind tibiae; abdomen bluish fuscous. *Al. ex.* $\frac{1}{6}$ inch. Kentucky in June. It is a rather coarsely scaled and distinctly marked species.

(To be Continued.)

CORRESPONDENCE.

DEAR SIR,—

I enclose a few words from Prof. P. O. Zeller, to whom I had sent a copy of my paper on the Tentamen, showing his utter condemnation of the present effort of a few of our lepidopterists to resuscitate Hübner. His letter is dated Grünhoff, 23 June, 1876. . . . "I know Scudder's work concerning the Generic Names of Butterflies, and I could not say wherein I do not agree with your verdict upon the same. Since that miserable, worthless Tentamen is such a foundation for Scudder's theory, he will consider himself unfortunate in having mistaken the date of its publication. . . . The Tentamen was printed, not in 1806, but in 1805. . . . Why not leave Hübner's birds and butterflies to sleep quietly in the grave? Since he has disturbed them, they will be shoo'd around for a while, let us hope as uselessly as the Tentamen."

Yours,

W. H. EDWARDS.

Coalburgh, 21 July, 1876.

The Canadian Entomologist.

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FARTHER NOTES UPON ARGYNNIS MYRINA.

BY W. H. EDWARDS, COALBURGH, W. VA.

In Vol. vii, Oct., 1875, I gave some account of my breeding *myrina* from eggs laid in July, 1875. I am able now to supplement this by the history of an earlier brood. My observations were made last year at Hunter, in the Catskill Mountains, and being at the same place in June of the present year, from 17th June to 1st July, I found this species abundant, and from the rubbed appearance of nearly all the individuals taken by me, I inferred that they had emerged at latest early in June. On the 19th I set two females on violet, in a gauze bag. On the 20th there were several eggs laid. The first butterfly from this lot emerged 15th July, but in their early stages these larvæ were not in my keeping, as I mailed them to Coalburgh. Other females gave eggs on 27th June; the larvæ hatched 3rd July. These I kept by me and brought to Coalburgh, following their changes carefully. The 1st moult occurred July 7th, the 2nd July 10th, the 3rd July 12th, the 4th on 15th; chrysalis on 18th; and the butterfly emerged 23rd July; 26 days from the laying of the egg. This is the history of half a dozen out of the fifty odd of the brood. The others were less regular in their changes, and the last two butterflies emerged 31st July, or 33 days from the egg. There were but four moults, and I was in error in stating last year that the species moulted five times. A remarkable proportion of the butterflies were females, at least four out of five. The first eleven which emerged were all females, and so were several of the last.

I turned the butterflies of this brood loose as they appeared, with the exception of three, hoping to naturalize the species here. They scattered up and down the valley at considerable distances as I occasionally discovered, but I rarely saw one within my grounds. On dissecting one of the three reserved, the abdomen was found filled with nearly mature

eggs. All these larvæ of both lots proceeded to chrysalis, none of them becoming lethargic, as do larvæ of many species of butterflies in their summer broods.

Early on 27th of July I turned out 12 *myrina*, which had emerged from chrysalis since the previous evening, and about nine o'clock I observed a pair in copulation in the grass near my house. They were perfectly quiet and I was able to examine the female carefully to see if there was any abrasion of scales on thorax above, or on the wings. She was perfect and I have no doubt was one of those turned loose that morning. Passing along an hour later, and seeing this pair still in the same spot, I placed the inner edge of my net gently by the female, and she immediately climbed up, dragging the male after her. From the net they were easily transferred to a box and left in quiet. At 7 p. m. they had not separated. By 6 next morning they had, and I at once set the female on a plant of violet, under a bag. Within an hour several eggs were laid on the leaves, and within 48 hours many more had been laid on the leaves and the bag, when I let the insect fly. I counted 93 eggs in all. I had noticed that the freshest possible females of *tharos* and of *nycteis* lay eggs readily on being shut up with their food plants, and the same thing with *Papilio ajax*, but hardly supposed the whole process was quite so rapid as in the present case. These eggs gave larvæ 4th and 5th of August, and the butterflies from them will again lay the eggs for the hibernating larvæ which will go to make the June brood of next year. Of this last brood of the year I as yet know nothing from observation. Whether the larvæ hibernate when half grown, as do the larvæ of many *Melitæas*, or as soon as hatched from the egg, as do the larvæ of *cybele* and other species of *Argynnis*, remains to be discovered.

In 1875, the eggs laid between 20th and 25th July produced butterflies by 3rd September. The eggs laid by the female 28th July, 1876, produces a corresponding brood with those of July, 1875, just mentioned. And this brood is the aestival of Scudder. But it should be called the autumnal, and the mid-brood, the butterflies of which have emerged between 15th and 31st July, as stated, the aestival, the early brood from hibernating larvæ being the vernal.

Description of Preparatory Stages of A. Myrina :

EGG—conoidal, slightly rounded at base, truncated and rounded at summit; marked by 14 (or about) thin vertical ridges, which are somewhat wavy, and mostly extend from base to summit, not quite meeting

about the depressed micropyle ; some of these ridges anastomose near the top, others lower, on the sides ; the spaces between the ridges roundly excavated and crossed by fine striæ.

YOUNG LARVA—Length, .08 inch ; cylindrical, slightly tapering posteriorly, deeply creased at the junction of the segments ; color pale green, but brown patches nearly cover segments 5, 7, 9 and 11 ; furnished with rows of tubercles from which spring black hairs, which are long and curved forwards ; head obovate, a little broader than 2nd segment, pilose, brownish black.

After 1st moult, length .2 inch ; grayish mottled with brown ; armed with 6 rows of short, stout, black spines, which have short black bristles ; feet and legs blackish ; head cordate, smaller than second segment, pilose, black.

After 2nd moult, length .3 inch ; cinereous mottled with black, the spines as before ; at the base and on outer side of the spines of the 1st lateral row, on the 3rd, 5th, 7th, 9th and 11th segments, a yellow patch ; head as before.

After 3rd moult, length $\frac{4}{10}$ inch ; cinereous brown, mottled with darker in small patches ; a pale black dorsal line, enlarged on each segment into a rounded spot ; the yellow patches as before, but rather orange than yellow ; spines longer, those of 2nd segment decidedly so, being between two and three times as long as any others and projected forward over the head ; head as before, bronze color.

After FOURTH MOULT and MATURE—Length 1 inch ; color cinereous brown, mottled with velvet black, there being a large patch at the base of each spine of the two dorsal rows, and which is edged with a pale color ; spines long, tapering, irregular, honey-yellow, often orange at base, with black bristles ; those on 2nd segment about $3\frac{1}{2}$ times as long as any others and porrected ; legs and feet black ; head cordate, with rounded vertices, with black bristles over surface ; color bronze.

CHRYsalis—Length .6 inch ; compressed laterally throughout ; the wing cases very prominent and flaring at base ; the head case not much flattened, its vertices prominent, conical, the intervening space being roundly excavated ; the mesonotum prominent, sharply compressed, followed by a deep excavation ; on the dorsum two rows of sharp, conical tubercles, those on 7th segment much larger than the others, and all anterior to these two gilded ; the two tubercles at head case also large, umber colored ; color light brown, the wing cases streaked with darker ; or the whole surface is a dark brown.

A SYNONYM OF ANISOPTERYX POMETARIA.

BY B. PICKMAN MANN, CAMBRIDGE, MASS.

In Dr. Packard's Monograph of the Phalænidæ, just issued, the name *Anisopteryx autumnata* is substituted for that of *A. pometaria*, on the ground that the name *A. pometaria* is a synonym of *A. vernata*, and I am quoted as subscribing to the latter proposition. I acknowledge that in Proc. Bost. Soc. Nat. Hist., xv, 382, I applied the name *A. pometaria* to that species which was subsequently shown to be *A. vernata*, but it was at the same time that I applied the name *A. vernata* to that species which I should now call *A. pometaria*, and which Dr. Packard calls *A. autumnata*; I therefore have maintained throughout that the names belong to entirely different species. I have endeavored, in Proc. Bost. Soc. Nat. Hist., xvi, 207, and verbally, to show that these names are not synonyms, and have succeeded so far that after Mr. Morrison had re-named *pometaria*, and was ready to publish his name, he withdrew it; after Mr. Riley had published a statement that *pometaria* Harris was not *pometaria* Mann,* he published another,† saying that it was. I had made the same mistake previously, which I now attribute to Dr. Packard, but I had not expected to find it made again after it had been corrected so many times.

Quite aside from the question of fact whether Harris did describe the autumn species as *pometaria* or not, there could be no question that I believed it, and that my writings should be so interpreted. I was surprised, therefore, to find my description of the monstrous female of "*A. pometaria* Harr., descr.," quoted under *A. vernata*, especially with a foot note stating explicitly that *vernata* was not intended.

My article in Proc. Bost. Soc. Nat. Hist., xvi, 163, which treats entirely of *pometaria* according to my understanding, is cited by Dr. Packard under both species.

I would therefore correct Dr. Packard's Monograph, p. 402, by erasing lines 13 to 16, 20, 21, 25, and putting *pometaria* in place of *autumnata* wherever it occurs in connection with these species. Moreover, the monstrous female of *pometaria* had four aborted wings, not two, as Dr. Packard states.

* Sixth Mo. Rep., p. 29.

† Seventh Mo. Rep., p. 80.

NOTES ON CERTAIN VARIATIONS OF SAMIA CECROPIA.

BY C. E. WORTHINGTON, CHICAGO, ILL.

The deceptive effect of the variable border on the apparent shape of the primary wings in *Samia cecropia* appears to have escaped general notice; indeed, in contrasting this species with *S. promethea*, the latter is universally mentioned as having the primaries much broader in proportion to the length. This is perhaps true of the average *cecropia*, but in numerous individuals I have found primaries even broader in proportion than in *S. promethea* ♀, and narrower than in *promethea* ♂, both by traced outlines and shadow projections, in several instances those with a wide light border appearing extremely narrow but proving to be even broader than the average.

This effect also extends to the so-called sexual difference in the wings, the margin usually being broader and lighter and the apical patch more brilliant in the males.

A careful comparison of a considerable number of specimens shows that no reliance can be placed on the breadth as a sexual character, and that even the antennæ (especially of those fed on *Negundo fraxifolium*) sometimes approach so nearly as to be barely distinguishable.

There are strongly marked variations in the apical patch outside of the Σ line, generally indicated by a purplish reflection, but sometimes brighter; occasionally above, and more frequently below, being a dull red or a brilliant crimson; more rarely over-running the line inwardly; the four black spots immediately inside of the zigzag line are often reduced to two, those nearest the apex being obsolete.

The discal spots vary greatly in color; normally dull red with a white centre, they are sometimes entirely red with no trace of white; in others they will be found almost white with merely a shade of red or pale brown about the margin, and at the sharp end, where color is always present, their shape varies from that of a pear to a long, curved (crescent-shaped) line or a short straight mark, rarely so small as to be almost obsolete.

Usually at the base of the primaries is a dull red spot, surrounded by a black and white line, and at the base of secondaries a prominent white patch extending along the upper margin; in the first either black or white may be wanting, while the latter, so far as regards the base of the wing, is

occasionally either entirely wanting or existing as a continuation of the margin of the basal patch on primaries; on the upper margin the shade appears to be constant, although sometimes obscured so as to appear a dull gray.

Similar variations are observable in the abdomen, vermillion and white, red, black and white, and rarely dark brown and white (the color of the wings); and in the wings, which may be dark brown sprinkled slightly with gray, and opaque or dull black, and semi-transparent; one specimen in my collection, with the primaries of the first and secondaries of the latter color, presented a curious appearance; this was one of two taken from *Ampelopsis quinquefolia*, the other having both wings thin and silky, and nearly as black as *Papilio asterias*. The palpi usually agree with the body, as do the legs; in this case both are dark red.

Notwithstanding these differences and the wide range in size ($4\frac{1}{8}$ to $7\frac{1}{4}$ inches being the extremes of perfect moths in my possession), *cecropia* agrees so well in general appearance that, aside from the black variety mentioned above, a distinctly marked variety is a rarity, the nearest approach I have seen being in four ♂ moths from cocoons found on rose bushes, in which nearly all the space on the primaries between the basal spot and the border, is finely flushed with red, which grows fainter outwardly, the same red flush being continued down the abdominal margin of secondaries, giving the entire moth a reddish hue; the occurrence of red on the primaries is not extremely rare, but I have never seen others than these with red on the secondaries, except in the border.

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

(Continued).

- 145. *Oiceoptoma americanum* Linn. has been known by the ante-Linnean name of *peltata*.
- 146. " *TERMINATUM* Kby. is a variety of the preceding.
- 147. " *AFFINE* Kby., variety of 145.
- 148. " *CANADENSE* Kby., variety of 145.

149. *Peltis ferruginea* Linn.
150. *Nitidula obscura* Fab.
151. " *ROSSIUM* Kby., same as 150.
152. " *discoidea* Fab. Subsequently described as *OMOSITA inversa* Lec., from California.
153. *Ips DEJEANII* Kby. is *VITTATUS* Say.
154. *Choleva SPENCIANA* Kby. is a *CATOPS*.
155. *SCAPHIUM CASTANIPES* Kby. is very rare. Occurs also in the White Mts., N. H.
156. *Leiodes PUNCTATOSTRIATUS* Kby. is *Anisotoma indistincta* Lec.
157. *Corticaria DENTICULATA* Kby. The name is preoccupied and was changed to *Kirbyi* Lec. It is probably *DELETUS* Mann.
158. *Atomaria atra* Steph. (Kby.) Incorrectly determined by Kirby and is probably a dark variety of *LAETULA* Lec.
159. *Cryptophagus HUMERALIS* Kby. is a *TRIPHYLLUS*, and is *ruficornis* Lec.
160. " *CONCOLOR* Kby. A variety of the preceding.
161. *Attagenus CYLINDRICUS* Kby. Belongs to a new genus, *PERIMEGATOMA* Horn. Trans. Am. Ent. Soc., 1875, p. 135.
162. " *pellio* Linn.
163. *Dermestes lardarius* Linn.
164. " *DISSECTOR* Kby. is *NUBILUS* Say.
165. *Byrrhus PICIPES* Kby. Name is preoccupied and is now *KIRBYI* Lec.
166. " *CONCOLOR* Kby. Now known to us. Is not a variety of *Cytilus varius* Fab., but appears to be a small *CYCLOPHORUS* Kby.
167. " *CYCLOPHORUS* Kby.
168. " *varius* Fab. This is an erroneous determination. The species is *CYTILUS TRIVITTATUS* Mels.
169. *Hydrobius fuscipes* Linn.
170. " *marginellus* Fab. Probably an erroneous determination and may be *PHILHYDRUS FIMBRIATUS* Mels.
171. " *melanocephalus* Ol. An erroneous determination and is *PHILHYDRUS PERPLEXUS* Lec. I have specimens from Mr. Pettit which correspond with Kirby's description of both the above species.
172. *Hister PAYKULII* Kby. is *DEPURATOR* Say.

173. *Hister HARRISII* Kby.
174. *Onthophagus latebrosus* Fab. is *HECATE* Panz.
175. " *SCABRICOLLIS* Kby. is *JANUS* Panz.
176. *Trox arenarius* Fab. (Kby.) This may be *AEQUALIS* Say.
177. *Pelidnota punctata* Linn.
178. *Camptorhina ATRACAPILLA* Kby. is *SERICA VESPERTINA* Schonh.
179. *Diplotaxis TRISTIS* Kby.
180. *Rhizotrogus fervens* Gyll. (Kby.) is *LACHNOSTERNA FUSCA* Fröhl.
181. " *DRAKII* Kby. A race of 180.
182. *Dichelonycha BACKII* Kby.
183. " *VIRESCENS* Kby. is *ELONGATULA* Schonh. Variety C
is *SUBVITTATA* Lec.
184. " *TESTACEA* Kby.
185. *Cetonia fulgida* Fab. is *EURYOMIA FULG.*
186. *Trichius BIGSBII* Kby. is *GNORIMUS MACULOSUS* Kn.
187. " *ASSIMILIS* Kby. is *AFFINIS* Gory.
188. " *ROTUNDICOLLIS* Kby. is *PIGER* Fab.
189. " *VIRIDANS* Kby. is *AFFINIS* Gory.
190. *Gymnodus FOVEATUS* Kby. ♂
191. " *RUGOSUS* Kby. ♀ is *OSMODERMA SCABRA* Beauv.
192. *Platycerus piceus* Weber (Kby.) is erroneously determined and is
DEPRESSUS Lec.
193. *Passalus interruptus* Linn. (Kby.) is *CORNUTUS* Fab.
194. *Campylus DENTICORNIS* Kby.
195. *Pedetes BRIGHTWELLI* Kby. is an *ATHOUS*.
196. " (*Asaphes*) *RUFICORNIS* Kby. is *ASAPHES MEMNONIUS* Hbst.
197. *Perimecus fulvipes* Hbst. (Kby.) is *MELANOTUS CASTANIPES* Payk.
198. " *communis* Gyll. is also a *MELANOTUS*.
199. " *SIMILIS* Kby. A *MELANOTUS*, but the synonymy is un-
known.
200. *Ctenicerus KENDALLI* Kby. is *CORYMBITES VIRENS* Schr.
201. *Elater AERIPENNIS* Kby. is a *CORYMBITES*.
202. *Buprestis RUSTICORUM* Kby. is a variety of *MACULIVENTRIS* Say.
203. " *PAGANORUM* Kby. is 202.
204. " *NUTTALLI* Kby.
205. " *lineata* Fab.
206. " *fasciata* Fab.
207. " *divaricata* Say is a *DICERCA*.
208. " *TENEBROSA* Kby. is a *DICERCA*.

209. Buprestis TENEBRICA Kby. may be the same as Dicerca *lugubris* Lec.
210. " TRINERVIA Kby. is a CHRYSOBOTHRIS.
211. " PROXIMA Kby. is CHRYSOBOTHRIS SCABRIPENNIS Lap. et Gory.
212. " DRUMMONDII Kby. is a MELANOPHILA.
213. " umbellatarum Fab. (Kby.) is erroneously determined and is ANTHAXIA INORNATA Rand.
214. " appendiculata Fab. (Kby.) is erroneously determined and is MELANOPHILA LONGIPES Say.
215. Agrilus BIVITTATUS Kby. is BILINEATUS Weber.
216. Trachys AURULENTA Kby. is BRACHYS OVATA Weber.
217. " ACUDUCTA Kby. Mr. E. Saunders (Trans. Ent. Soc., London, 1868, p. 60) says this is a CISSEIS and from Australia.
218. Pytho NIGER Kby.
219. " AMERICANA Kby.
220. Trogosita AMERICANA Kby. is probably *corticalis* Mels.
221. Monochamus RESUTOR Kby. is SCUTELLATUS Say.
222. " CONFUSOR Kby.
223. " MARMORATOR Kby. is probably that variety of SCUTELLATUS Say, called *Oregonensis* Lec.
224. Acanthocinus (Graphisurus) PUSILLUS Kby. is now called GRAPHISURUS PUSILLUS Kby.
225. Callidium AGRESTE Kby. is a CRIOCEPHALUS.
226. " striatum Linn. (Kby.) is ASEMUM MOESTUM Hald.
227. " COLLARE Kby. is now GONOCALLUS COLLARIS.
228. " PROTEUS Kby. is now MERIUM PROTEUS.
229. " SIMILE Kby. is 228.
230. " DIMIDIATUM Kby. is a PHYMATODES.
231. " (Tetropium) CINNAMOPTERUM Kby. is known as a TETROPIUM.
232. Clytus UNDATUS Kby. is XYLOTRECHUS UNDULATUS Say.
233. " LUNULATUS Kby. is the same.
234. " FUSCUS Kby. A variety of the same.
235. " LONGIPES Kby. is a NEOCLYTUS.
236. " MURICATULUS Kby. is a NEOCLYTUS and has since been described as *leucozonus* Lap.
237. Hargium lineatum Ol. is a RHAGIUM.

238. *Pachyta LITURATA* Kby.
 239. *Leptura CHRYSOCOMA* Kby.
 240. " *SUBPUBESCENS* Kby. is *PROXIMA* Say.
 241. " *ERYTHROPTERA* Kby. Variety of 242.
 242. " *canadensis* Ol.
 243. " *TENUIOR* Kby. is *TYOCERUS VELUTINUS* Ol.
 244. " *BREVIS* Kby. is *L. VAGANS* Ol.
 245. " *sexmaculata* Linn.
 246. " *SEMIVITTATA* Kby. is *L. VITTATA* Ol.
 247. " *GULOSA* Kby. is also *L. VITTATA* Ol.
 248. " *SUBARGENTATA* Kby.
 249. " *SIMILIS* Kby. is *rufibasis* Lec.
 250. " *LONGICORNIS* Kby. is *ACMAEOPS marginalis* Lec.
 251. " *PROTEUS* Kby. is an *ACMAEOPS*.
 252. " *LONGICEPS* Kby. is *ACMAEOPS PRATENSIS* Laich.
 253. *Anobium FOVEATUM* Kby. is a *HADROBREGMUS*.
 254. *Cis micans* Fab. (Kby.) Unknown; seems to be *CHEVOLATII* Mell.
 255. *Tomicus pini* Say.
 256. *Apate BIVITTATA* Kby. is a *XYLOTERES*.
 257. " *RUFITARSIS* Kby. is a *XYLOTERES* unknown to us.
 258. " (*Lepisomus*) *RUFIPENNIS* Kby. is a *POLYGRAPHUS*.
 259. " (*Lepisomus*) *NIGRICEPS* Kby. Probably the same as 258.
 260. " (*Lepisomus*) *BREVICORNIS* Kby. Unknown.
 261. *Hylurgus RUFIPENNIS* Kby. is a *DENDROCTONUS*.
 262. *Calandra pertinax* Ol. is a *SPHENOPHORUS*.
 263. *Hylobius CONFUSUS* Kby.
 264. *Lepyrus colon* Linn.
 265. " *GEMELLUS* Kby.
 266. *Cleonis VITTATUS* Kby. is *CLEONUS*.
 267. *MACROPS MACULICOLLIS* Kby.
 268. " *VITTICOLLIS* Kby.
 269. *LEPIDOPHORUS LINEATICOLLIS* Kby.
 270. *Trachyphloeus MELANOTHRIX* Kby. Constitutes, with a California species, a new genus, *GEODERCES* Horn.
 271. *Pachyrhynchus SCHONHERRI* Kby. is *ITHYCERUS NOVEBORACENSIS* Forst.
 272. *Attelabus SIMILIS* Kby. is *ANALIS* Illig.
 273. " *bipustulatus* Fabr.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

ASYCHNA.

A. ? pulvella. N. sp.

This species is placed in this genus provisionally. It is certainly not a true *Asychna*. Indeed, almost the only character common to all the species which Mr. Stainton places in this genus is their ornamentation, and in this respect *Laverna ? gleditschiæella* is an *Asychna*, whilst this species is far from it. This species (*pulvella*) differs widely enough from all the others in ornamentation ; but structurally it approaches this genus so nearly that rather than construct a new one for it, I place it here provisionally. Taking for comparison Mr. Stainton's figures in Ins. Brit., v. 3, the wings of *pulvella* resemble those of *A. æratella* more nearly than any of the other species. They are, however, more narrow and elongate ; the dorsal margin of the fore wings is nearly straight, while the costal curves down to it nearly as in *A. modestella* reversed ; that is, the costal of *modestella* represents the dorsal of *pulvella*, and the dorsal of *modestella* is a little more curved than the costal of *pulvella*. The neuration is exactly as in *æratella*, except that the cell is unclosed in the fore wings and in the hind wings *pulvella* has one more branch of the median vein (placed between the second and third of *æratella*), and continued through the cell. The palpi are more like those of *A. terminella*. The antennæ are slender, longer than the body, and shorter than the wings. Its attitude in repose resembles that of *Bedellia somnulentella*, to which it bears some resemblance in coloration.

Head, palpi, antennæ, thorax and fore wings whitish, but so densely dusted with ochreous brown as to obscure the ground color ; the antennæ are faintly annulate with whitish, with three large white annulations before their tip, which is also white ; the second and third of these annulations are intermediate between the first and the tip. The fore wings have a brown streak along the fold and another further back on the disc, and a small white spot at the end of the cell. The ciliae are grey, those of the apex dusted with ochreous brown. Upper surface of the abdomen of the general hue ; beneath it is paler and the anal tuft is silvery white. Legs of the general hue, the tarsi annulate with white and the first pair brownish on their anterior surfaces. *Al. ex.* $\frac{3}{8}$ inch. Kentucky in June.

ELACHISTA.

E. ? cristatella. N. sp.

This insect, of which I have but a single captured specimen, (in good condition, however,) in its depressed head and its forehead rather acutely angulated, as well as in the size and appearance of the antennae, reminds one strongly of *Aeaea ostryælla* Chamb., as it does also in the ornamentation. As, however, *Aeaea* is near *Elachista*, and the palpi in this specimen are more elongate and slender than in *Aeaea*, and I have not examined the neuration, I place it provisionally in *Elachista*.

Head and face white ; the palpi iron gray mixed with white. Antennæ brown. Thorax and wings dark iron gray dusted with white ; just before the middle the white dusting forms an indistinct line across the wing, faintly indicating a fascia which is margined on the dorsal edge of the wing by a small raised dark brown tuft. The under surface of the thorax and abdomen and the basal joints of the legs are silvery yellowish, the tibiae and tarsi dark brown on their outer surfaces and annulate at the joints with white, and the anal tuft is silvery. *Al. ex.* scant $\frac{1}{4}$ inch. Kentucky in June.

COLEOPHORA.

C. nigrilineella. N. sp.

Second joint of the palpi with a minute tuft at the apex beneath, and basal joint of the antennae with scales projecting in front.

Palpi (except the whitish inner surface), head, thorax and fore wings ochreous ; basal two-thirds of the antennae with alternate annulations of white and brown ; the apical third slender and white. Hind wings and upper surface of the abdomen brownish slate color, with two short longitudinal blackish lines on top of each abdominal segment, except the last two, and which are very distinct in fresh specimens, but less so in dry ones ; under surface of abdomen and anal tuft yellowish silvery ; ciliae of both pairs of wings yellowish ochreous, a little paler than the ground color of the fore wings ; anterior surface of the fore legs brownish. *Al. ex.* not quite $\frac{1}{2}$ inch. Kentucky ; captured in July, and I have in a single instance bred it from a somewhat pistol-formed case which was found attached to a leaf stem of the Black Walnut (*Juglans nigra*). The case is yellow with pistol *handle* brown, except on its under side, where it is white, and there is a triangular projection on top of the *barrel* near the muzzle, by which it was attached to the stem,

GELECHIA.

G. Clemensella. *N. sp.*

Second joint of palpi much larger than third, and somewhat brush-like.

Deep roseate with a pale purplish lustre (or perhaps pale ochreous red will be as accurate). The palpi have a dark brown annulus at the base of the third joint and another before its tip; some of the scales are tipped with hoary, and the head, thorax and wings are dusted with dark brown scales, which are aggregated into small specks and spots and are denser in the apical than in the basal half of the wing; the brown spots are more distinct along the costa than elsewhere, and are there equally distinct on the under side; there are three or four small white spots on the disc, and an irregular, not very distinct, white fascia beginning on the dorsal margin near the base, but not extending entirely across the wing. Ciliae of the general hue. *Al. ex.* $\frac{3}{4}$ inch. Received from Mr. W. H. Stultz, of Easton, Pennsylvania, the former residence of Dr. Clemens, who does not seem to have known the species; at least he has not described it, though it appears to resemble *G. salicifungiella* in some respects.

G. Saundersella. *N. sp.*

Palpi simple; third joint nearly as long as second, brown; the tip of the second joint, an annulus about the middle of the third and its tip pale creamy yellow. Head creamy yellow dusted with blackish; thorax blackish tipped with pale creamy yellow; fore wings pale creamy yellow densely dusted with blackish scales beneath the fold; a blackish spot on the base of the costal margin, another about the basal fourth on the costal margin, which is not distinctly separated from one placed obliquely behind which touches the fold; another on the costal margin just behind the middle, behind and beneath which is another just above the end of the fold, and the apical part of the wing very densely dusted with blackish; ciliae of the general hue, with a dark brown hinder marginal line (or row of blackish specks) at their base. Hind wings rather deeply emarginate beneath the tip and pale slate color; abdomen pale yellowish tinged with fuscous; anal tuft pale yellowish. Antennæ annulate with pale creamy yellow and blackish. First two pairs of legs dark brown, the tarsi annulate with creamy yellow; hind legs creamy yellow, marked with dark brown or blackish spots. *Al. ex.* a little over $\frac{1}{4}$ inch. Kentucky in July. I have named this rather pretty little species for the editor of the CANADIAN ENTOMOLOGIST.

ON FOUR NEW CALIFORNIAN HEPIALI.

BY JAMES BEHRENS, SAN FRANCISCO, CAL.

The species described in this paper are from Mendocino. The genus seems to be more numerously represented on the West than on the East Coast of North America. Some of the new forms resemble the European. To none of these species can I refer Dr. Boisduval's descriptions of *hectoides* or *californicus*.

Hepialus sequoiolus, n. s.

Three specimens. Primaries light brown with five darker, black margined, interrupted bands marked on costa by separated spots, the fourth, just before apex, slightly furcate. The terminal or outer band is extended along the veins to the outer margin, interspaceally lunate. From the median fold to internal margin the first band is composed of silvery white united spots, preceding the second band, which is powdered with black and shows inwardly an ochre line. Between the third and fourth bands below vein 5 to internal margin, runs a similar white and narrower band. There is a basal white dash, above which a blackish shading. Hind wings blackish, with fringes and costal margin marked with brown. Beneath the fore wings are marked with pale brown on costa and reflect partially the bands of upper surface. Thorax camel's hair brown, with the abdomen perhaps paler. *Expanse* 37 to 40 mil.

A single specimen differs by its increased size and the absence of the white bands; else, while paler colored, it seems to agree. I am undecided about the value of this form at the present writing.

Hepialus mendocinulus, n. s.

Five specimens. Allied to the preceding and to *ganna* of Europe, but tinged with reddish and more unicolorous and smaller. The darker bands are obsolete in three specimens. In *ganna* the white bands are often connected and the outer one runs from the apex. In this species the white bands are more oblique, parallel, and obtain over the primaries below the cell. A white dash at base connected with the first white band. The brown of the thorax shows a pink tinge and the blackish hind wings are pinkish on the fringes. *Expanse* 32 to 35 mil.

The white bands occupy the same position as in *sequoiolus*, but I do not think it is a form of that species, although eventually it may be found the same.

Hepialus Baroni, n. s.

Four specimens. A distinct species, with concolorous primaries on which the bands are hardly legible. In the best marked specimens they are gray, while the wings are tinged with dull red. The third and fourth bands are fused, and the outer edge of the fourth band is even and marked. At first sight there is little visible except the broader, extra-basal, curved gray band, and the band beyond the cell which I call the fourth. There is a subterminal, narrower, or fifth band. Thorax and hind wings blackish tinged with dull red. *Expanse* 32 to 48 mil.

Named for Mr. Baron, of Mendocino, with whom I have spent some pleasant days in the collection of Lepidoptera. Specimens vary much in size.

Hepialus Lenzi, n. s.

Six specimens. The smallest species and the brightest colored. The ground color is blackish and there is a very bright red tinge on the fringes, costa and the bands. Of these but two are visible, ochre in color, margined with bright red; the outer furcate superiorly, the inner rounded, and limiting outwardly the paler base of the wing. The hairs of the thorax have a bright red tinge; the abdomen is more yellowish brown. The blackish hind wings have yellowish fringes. Beneath the legs are tinged with very bright red, and so also is the costal margin of the wings. *Expanse* 25 to 27 mil.

This pretty species I name after Professor Henry Lenz, Curator of the Lubeck Museum.

In conclusion, I express my obligations to Prof. A. R. Grote, Director of the Museum of the Buffalo Society of Natural Sciences, for an examination of my types and his opinion on the same.

After examining my type of *Saturnia mendocino*, described in the ENTOMOLOGIST, Prof. Grote considers it a true *Saturnia*, and points out that in its yellow hind wings it resembles the European *S. carpini* ♂, while it differs from the European species of the genus by the obsolescence of the lines, the concolorous wings and the reduction of the ocellate marks in size.

MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE
AMERICAN ASSOCIATION FOR THE ADVANCE-
MENT OF SCIENCE.

In accordance with previous announcement, the members of the Entomological Club met on Tuesday, the 22nd of August, at 2 : 30 p. m., in the rooms of the Buffalo Society of Natural Sciences, Dr. LeConte in the chair. The following members were present : Dr. John L. LeConte, Philadelphia, President ; S. H. Scudder, Cambridge, Mass., Vice-Pres't ; C. V. Riley, St. Louis, Mo., Secretary ; J. A. Lintner, Albany, N. Y. ; Dr. H. Hagen, Cambridge, Mass. ; Dr. John G. Morris, Baltimore, Md. ; B. P. Mann, Cambridge, Mass. ; W. Saunders, London, Ont. ; Rev. C. J. S. Bethune, Port Hope, Ont. ; E. B. Reed, London, Ont. ; A. R. Grote, M. M. Maycock, Dr. L. F. Harvey, Henry S. Sprague, O. Reinecke, W. W. Stewart, of Buffalo, and others.

PRESIDENT'S ADDRESS.

After calling the meeting to order, the President read the following address :—

In resuming the chair, which by your kind partiality I occupied at the last meeting of the club, permit me, after thanking you for the honor you have done me in thus calling me a second time to this position, to congratulate you on the evidence of increased interest felt in the branch of Zoology to which we give our attention.

This increased interest is shown not only by the larger attendance at the present meeting of Entomologists from distant residences, but by the increase of correspondence between those who collect and study insects. I have received during the year several applications from new correspondents for advice and assistance in the study of Coleoptera ; and my colleague, Dr. Horn, informs me that the same is the case with himself. Unfortunately I have been obliged to reply to some of the applicants with a temporary negative, as my time has been almost wholly taken up with efforts to complete my memoir on Rhynchophora, now in course of publication by the American Philosophical Society. This memoir would have been finished some weeks ago, but the exceptional inclemency of the summer heat rendered all work with lenses difficult and uncertain. I think I may promise that the MSS. will be complete in a few weeks. Meanwhile I am glad to say that the arrangement of my cabinet specimens is so far perfected that Dr. Horn or I will be willing to name any sets of

Rhyncophora of the United States or Dominion of Canada, which are sent us, provided that the return of the specimens sent is not required. The subject has been such an extremely troublesome one, and there are still so many uniques in our cabinets, that they need filling up in order to give them that value for future reference which I hope they will possess, and it will also be desirable for the proper recognition of the new genera and species, many of which are very abundant, that specimens should be distributed to foreigners, who have studied this difficult group of objects.

The excellent volume of Dr. A. S. Packard, jr., "Monograph of the Geometrid Moths of the United States," forming Vol. X of the United States Geological Survey of the Territories, requires special mention among the contributions to Entomology since our last meeting. We owe the existence of this volume to the enlightened policy of Dr. F. V. Hayden, Geologist-in-Chief of the Survey, and I hope that a continued appreciation by the National Legislature of the importance of the work done and published by the Survey, will ensure us many future volumes of similar merit.

The ordinary routine work of the description of new genera and species, is going on in the various orders of insects with about the usual degree of rapidity. But from every one comes the same complaint: Too many new forms to be described!

The observations on economic applications of Entomology for the protection of agriculture are also advancing in a most commendable manner, considering that the public and their servants in office still fail to recognize the magnitude of the interests involved.

References to the memoirs contained in the volumes of reports, and to isolated papers in agricultural and other journals, will be found in *Psyche*, a periodical, which, though small, is indispensable to every one occupied in the study of the insects of North America.

I would gladly stop here, but a truthful instinct, a sense of duty to science, and my obligation to you alike forbid silence. I have to speak of a subject of a disagreeable nature.

It is concerning the efforts made by you and other members of the Association at the last meeting at Detroit, to procure the appointment of a Commission for the protection of agriculture against noxious insects; this Commission to be composed of properly informed men of science, and chosen under such circumstances as would prevent the influence of political bias, or personal favoritism. If I do not fatigue your memory too much, you will recollect the memorials that were so extensively signed

in relation to this subject, copies of which memorials are again before you. These memorials were extensively circulated at the West, and were signed by many of the most influential bodies for the promotion and protection of agriculture in that region. During the winter these memorials were sent to Congress, in the expectation that some proper legislation would follow. One of the Senators, in fact, introduced a bill which seems to have been very carefully considered, and indeed bears upon its face some evidence of scientific guidance. This bill provided for the appointment of three Commissioners for five years, the Commissioners to be nominated by the Council of the National Academy of Science to the Secretary of Interior. This bill, having been referred to the Committee on Agriculture, was returned, completely orchidized, in such form as to provide for one Commissioner, to be appointed by the Department of Agriculture, the very enemy and incubus from which the western agriculturist specially desired to be relieved.

The bill in this form passed the Senate, several of the members taking occasion in the discussion which preceded the passage to talk to the demonstration of their own ignorance of the subject. However, this discussion has been already so severely commented upon in several of the newspapers of the Mississippi Valley, that it is quite unnecessary for me to add anything farther, except the hope that the Legislature which choose the successors of those Senators will have men of better education and higher intelligence offered to them as candidates for the position.

I regret to have been obliged to introduce this unpleasant subject, about which I feel a warmth and severity, unsuited to the position in which you have placed me. I must therefore close by begging you, in your respective localities, to continue aiding me in my endeavor to cause the Government authorities to give proper attention to this most important subject.

The minutes of the last meeting held in Detroit were read by the Secretary, C. V. Riley, and approved.

The consideration of reports of committees was postponed, owing to the non-arrival of some of the members.

Mr. Riley made some remarks upon the variation in the venation of the wings of *Anisopteryx pometaria* (or *A. autumnata*), and exhibited mounted preparations of wings of this insect differing greatly from the figures in Dr. Packard's new work.

Mr. Grote considered the variation of neuration in the Geometridæ as of no great value as a specific distinction.

Mr. Riley said that he had scarcely ever raised a large number of forms from the egg without finding that in the imago state there appeared to be more than one so-called species. Whenever he used large quantities of material he found this result. He thought, therefore, that writers when describing species should always state the number of specimens they had before them.

Dr. Hagen then read a valuable paper "On Genera," at the conclusion of which he was warmly applauded. This paper will appear in next issue.

On motion of Mr. Grote, the report of the Committee on Nomenclature was then taken up, when Mr. Riley read a majority report of the Committee.

Mr. Scudder did not approve of the course taken in reference to the rules on nomenclature which had been presented, and thought that members of the committee had exceeded their instructions, and desired that the resolution passed at the last meeting, appointing the committee and defining its duties, be read. He thought that the opinions of leading naturalists on this subject should have been gathered and compared.

The resolution giving instructions to the committee was read as follows: "That the Club appoint a committee of five to prepare and present to the Club at its next annual meeting a compendium of the views of the leading Entomologists of the country upon points which, in their judgment, require elucidation, and also to present a series of resolutions touching such points, in order that intelligent discussion may be had upon them and some general agreement, if possible, arrived at."

Mr. Riley urged as reasons why a majority report had been presented, the difficulty of getting the members of the committee together, and the urgent necessity that some action should be taken in the matter without further delay.

Mr. Saunders supported these views, and urged that the opinions of many of the leading Entomologists on the subject of nomenclature had been given in the pages of the CANADIAN ENTOMOLOGIST during the past year, while others had expressed their views by letter to members of the committee; and seeing that there had been no opportunity for the committee to meet together as a whole, he thought it desirable that these resolutions, which had been endorsed by a majority, should be presented as a guide to the discussions which might take place on the subject.

Mr. Scudder did not think this a proper time or place for the introduction of such rules; he fully agreed, however, that it was very desirable to establish stability in nomenclature.

Mr. Mann regarded Mr. Scudder's remarks as a motion to set aside these rules, and as such was prepared to support it.

Dr. Hagen, in a few words, gave a sketch of the history of nomenclature, showing how tidal waves of new names had been poured from time to time on the Entomological world with the greatest zeal on the part of those who had introduced them; that in many instances these changes were unnecessary and produced confusion instead of establishing order. He thought it highly necessary that some understanding should be arrived at among Entomologists which would lead to greater stability in nomenclature.

Mr. E. B. Reed spoke for those who had comparatively little time to devote to Entomology, and thought that they were a class who should be considered, and that while it was perhaps no great task for those who devoted their whole time to Entomological studies to master the great number of new generic and specific names from time to time introduced, it was imposing a burden on their less fortunate brethren which was grievous to be borne, which was, in fact, more than they could bear, and tended to discourage many and deter others from entering on the study of Entomology. He urged that it was from among the ranks of these beginners that some of the future leaders of Entomological science would be drawn, and it was well to consider what effect these discouraging circumstances would have on the present and future progress of the study.

After some further discussion, the resolutions were referred back to the committee to report on to-morrow. Meanwhile they were ordered to be printed for the members, so that discussion could be had upon them.

EVENING SESSION.

At 7.30 the meeting was again called to order, the President in the chair.

Mr. Riley offered some remarks on a parasite, a mite which attacked the Colorado Potato Beetle. This insect (of which mounted specimens for microscopic examination were submitted) is furnished with a strange and extraordinary development of what he supposed were the maxillæ, by which it was able to attach itself to the Doryphora, and at the same time extract nourishment as well. He thought it was an organ somewhat similar in character to the extensile maxillæ of the larvæ of Dragon Flies.

Mr. Scudder thought that since they appeared to him to be jointed they must be a palpus of some sort.

Dr. LeConte, after further examination, was of opinion that they were not jointed.

(To be Continued.)

The Canadian Entomologist.

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No. 10

MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCE- MENT OF SCIENCE.

(Concluded from September No.)

Mr. Scudder then read an interesting paper on "Mimicry in Butterflies explained by Natural Selection," quoting largely from a recent contribution by Fritz Muller on this subject, in which he gives the results of observations made by him on butterflies in Southern Brazil. This paper will appear in *Psyche*, the organ of the Cambridge Entomological Club.

Mr. Riley gave the result of some observations on the eggs of *Corydalis cornutus*, from which it would appear that the mass of eggs hitherto regarded as belonging to this species are probably those of a *Belostoma*. He had found in one day thirty or forty patches of eggs which he believed to be those of *Corydalis cornutus* on the leaves of trees whose branches overhung the water. These flat patches were very strangely arranged and contained an immense number of eggs, often numbering between three and four thousand in a patch. The eggs are at first translucent, but become darker as they approach maturity, when the young larvæ break through the eggs beneath.

Dr. Morris doubted whether these really were the eggs of *C. cornutus*, and questioned whether the larva was aquatic at all.

Dr. Hagen thought that there was something strange in reference to these insects. Mr. Riley had kindly sent him a large number of eggs, but when hatched he had failed in every attempt to keep the young larvæ alive. Since they are furnished with both branchia and stigmata, he thought they must be regarded as water insects.

Mr. Lintner had found the larvæ under stones, but when they enter the chrysalis state they make their way into the water, and in this condition they are often captured in large numbers and used as fish bait.

Mr. Riley said that the larvæ in Missouri are frequently found in water, and he had no doubt but that the eggs he had referred to were those of *Corydalis cornutus*.

Mr. Scudder stated that Mr. Sanborn had frequently taken large numbers of the larvæ in the water in the neighborhood of Cambridge.

Mr. Saunders had never found them in the water, but had frequently captured them buried in moist sand or under stones along the banks of rivers.

Mr. Riley next exhibited to the Club some silken masses containing eggs of *Hydrophilus triangularis*, which were very remarkable and interesting.

Mr. Saunders offered some remarks on a mass of pupæ and escaping insects of *Calopteron reticulatum*, which he found one morning early in summer at the roots of some long grass. The mass was fully as large as a hen's egg, and must have contained some hundreds of individuals. A large number of the freshly escaped insects were captured with a view to ascertain whether there was much variation in the markings and whether the form *terminalis*, which is said to be a variety of *reticulatum*, could be found among them. He saw none approaching this latter form—all were well marked specimens of *reticulatum*.

Dr. LeConte mentioned the curious fact that in some species of *Calopteron* the larval skin was not shed when it pupated, but that the larva skin and pupa skin both remained *in situ* until the perfect insect escaped.

Dr. Morris then made some interesting remarks on the mouth parts of the woodpeckers.

Mr. Riley exhibited specimens of blown larvæ very nicely set up; he thinks, however, that in this condition they are scarcely of value for scientific study, and for this purpose prefers the specimens preserved in alcohol.

Mr. Scudder differed from Mr. Riley, and thinks that the advantages are in favor of the blown specimens, and much prefers to study larvæ in this way.

Dr. Hagen agreed with Mr. Scudder that blown larvæ were advantageous for study.

Dr. Morris asked if any of the gentlemen present who were in the habit of raising larvæ, had made any observations in reference to the length of time the development of the perfect insect may be retarded.

He stated that three or four years since he had placed a number of cocoons of *S. cynthia* on a shelf in his house, and that after lying there all that time some of them had this year produced the perfect insect.

Dr. Hagen referred to an instance related by Kirby & Spence where a beetle, *Buprestis splendida*, was ascertained to have existed in the wood of a pine table more than twenty years (7th edition, p. 121).

Mr. Saunders mentioned the fact that the perfect insect of *Æcanthus niveus* frequently came to sugar at night, when they were readily captured. He thought that where they were very numerous this method of trapping them might be employed with advantage.

Mr. Lintner observed that he had taken 16 species of *Catocala* at sugar this season, and that a friend of his who has been sugaring industriously has found the *Catocalas* to be most abundant about midnight.

On the 24th another meeting of the Club was held at 2 p. m., the President in the chair.

The Committee on Nomenclature, consisting of Dr. LeConte, S. H. Scudder, A. R. Grote, C. V. Riley and W. Saunders, reported a set of rules, on some of which they were unanimous, while on others there was a divided opinion. They had given all the attention to the subject possible within the limited time at their disposal, but had not found time to consider the explanations offered in the majority report presented, and suggested that these be referred back to the Committee with power to print such explanations as may be agreed on with the rules.

The following are the rules submitted :

1. The binominal system, as originated by Linnæus, is the only one to be recognized. The use of a third word, however, connected with the second by a hyphen, as is common and desirable in the case of gall insects, e. g., *Cynips quercus-palustris*, is not to be considered as an infraction of this rule. (Unanimous.)

2. Where a specific name has been generally adopted during a period of twenty years, such name shall not be changed for one of prior date. (Divided opinion.)

3. The name placed after a genus should be that of the author who established the genus in the sense in which it is actually used, but the name of the author who first proposed the term should be cited in brackets. (Unanimous.)

4. No generic or specific name should be acknowledged which has not been printed in a published work. (Unanimous.)
5. A generic name, when once established, should never be cancelled in any subsequent subdivision of the group, but retained in a restricted sense for one of the constituent portions of the original genus. (Unanimous.)
6. In constructing family names they should end in *idx*. (Divided opinion.)
7. The tribe should occupy an intermediate place between the subfamily and genus. (Unanimous.)
8. The authority for the species and not for the generic combination should follow the name of an insect. (Divided opinion.)
9. The proposition of a genus by simple designation of a type is to be greatly deprecated. All new names should be accompanied by ample definitions that will permit no doubt as to the species intended or as to the characters of the genus proposed. (Unanimous.)
10. No description should be made from a figure. (Unanimous.)
11. The number of individuals upon which either a specific or generic diagnosis is based should always be stated. (Unanimous.)

After a lengthy discussion, on motion of Mr. E. B. Reed, the following resolution was unanimously passed :

That the report of the committee be adopted, and that any rules on which this committee have expressed a divided opinion have a marginal note attached thereto, reciting such fact.

It was also resolved that all the explanations, &c., offered in the majority report be referred back to the committee with power to print such explanations as may be agreed on, with the rules.

Moved by Rev. C. J. S. Bethune, seconded by S. H. Scudder—That no alteration or addition to the rules now adopted be made, unless such alteration or addition be proposed at one annual meeting of the Club, and be adopted at a subsequent annual meeting. Carried unanimously.

The election of officers for the ensuing year then took place, resulting as follows : President, Dr. LeConte ; Vice-President, S. H. Scudder ; Secretary, C. V. Riley.

Mr. Scudder brought to the notice of the members a pattern insect box, which he believed to be pest-proof. These boxes are exceedingly

well made (manufacturers, Hancock & Greeley, Cambridgeport, Mass.), are about 19 x 15 in., and are sold at \$2.70 each, without cork.

Mr. Saunders suggested the desirability of the Club appointing a permanent committee to whom disputed points in reference to Entomological matters might be referred. On motion of Mr. Mann, seconded by Mr. Saunders, it was resolved that the Permanent Committee of the Club shall consist of the President, as chairman, and four other members to be named by him.

Mr. Lintner presented to the meeting a very complete and extensive list of insects taken at sugar by him during the present season. These were arranged in a tabular form in a very neat and methodical manner, showing at a glance the insects taken each evening, and whether they were abundant or scarce.

On motion of Mr. Riley, Dr. Larkin was requested to bring before the Club some facts in reference to a mite said to be parasitic on the human subject, when he read a very amusing letter from an afflicted patient in reference to this matter. The Club then adjourned.

LARVA OF ANAPHORA AGROTIPENNELLA.

BY MISS MARY E. MURTFELDT, KIRKWOOD, ST. LOUIS, MO.

In Vol. 4, p. 137, of the CANADIAN ENTOMOLOGIST, Mr. Grote first published a description of the large and characteristic Tineid above named. The imago has been very common with us for several years, but until the present season its larval history had eluded my investigation.

Early in April I found among the roots of a bit of white clover sod a very active and singular larva, whose long and rather sprangling thoracic legs gave it, at first glance, the appearance of a Coleopterous larva. A second look, however, discovered the characteristics of a Lepidopteron of which the following description was taken :

Length, 0.75 inch. ; diameter greatest at head and 1st joint, slightly tapering thence posteriorly. Incisions quite deep. Color a dark purple brown, the general surface dull, having the appearance of very fine

stippling, but variegated with conspicuous, slightly elevated, polished spots, eight on each thoracic, and ten on each abdominal joint. The anal segment and the one immediately preceding it lighter in color than the others, and somewhat translucent. Head horizontal, broad and thick, of a highly polished black color, the triangular face outlined by a fine line of brown. Basal joint of antennæ transparent, 2nd joint tipped with black, terminal joint entirely black. Maxillæ similar. Thoracic legs unusually long, black, except at the joints, where they are translucent cinereous. Venter and prolegs—the latter only moderately developed—of a translucent smoky brown, the anal pair variegated with irregular patches of opaque dark brown.

This larva was placed in a large jar partially filled with earth, and from time to time the clover sod was renewed; but I saw nothing more of it until about the 1st of May, when, thinking it to be dead, I was proceeding to sift the earth in the jar. My attention was soon attracted by a long string of webby matter in the soil, which I at first supposed was some sort of fungus growth, although remarkably tough and strong for anything of that kind. As I was pulling it to pieces, a shining black head was suddenly protruded from one end, and I at once recognized the missing larva. The webby substance proved to be a silken gallery, white and smooth inside, which constituted the concealed retreat of this interesting little creature. The gallery has an open entrance at the surface of the ground, from which its inmate emerges at night to feed. A little pressure from below forced the larva from its hiding place, and I was enabled to observe that it had increased in size, the length being about one inch with a diameter of 0.15 inch. at the 1st joint; the color was also a shade lighter than when my description was taken; otherwise it was unchanged.

June 16th I carefully unearthed the gallery a second time, and found it to be nearly six inches in length, descending by irregular windings to the bottom of the jar, two and one-half inches. About mid-way reposed the insect in the pupa state. The chrysalis is slender, elongate, the abdominal segments sharply edged, but not serrated, and of a mahogany brown color. The palpal sheaths are conspicuous, extending down on the ventral side as far as those of the antennæ. June 29th the moth issued, and I was delighted that it proved to be the species of *Anaphora* whose larval habits I had long desired to ascertain.

LIST OF CATOCALÆ OBSERVED IN THE VICINITY OF
CINCINNATI, OHIO, 1876.

BY CHARLES DURY, CINCINNATI, O.

Catocala Schrank.*Group 1*—Secondaries black without bands :

Viduata Guen., the largest black-winged species ; rare ; 3 taken in
10 years.

Lacrymosa Guen., rather common this season, but only 1 seen in 10
years before.

Desperata Guen., not rare.

Retecta Grote, not abundant.

Robinsonii Grote, not abundant ; occurs in fall only.

Levettei Grote (= Judith Streck.), rare ; occurs in early summer.

Epione Drury, abundant ; in early summer comes freely to sugar,
sometimes before dark.

Tristis Edwards, very rare ; the smallest black-winged species ; only
one specimen seen.

Obscura Strecker, abundant.

Flebilis Grote, not abundant.

Insolabilis Guen., rare previous to 1872 ; now abundant.

Var. Residua Grote, not abundant.

Group 2—Secondaries red with black bands :

Cara Guen., abundant ; 150 taken this summer.

Amatrix Hüb., abundant.

Ilia Cram., abundant ; very variable.

Innubens Guen., abundant.

Var. Scintillans Grote, not rare ; this species may properly belong in
Group 3 ; reared on Walnut.

Ultronia Hüb., abundant.

Marmorata Edwards, rare ; one specimen of this princely colored
species taken this summer.

Parta Guen., abundant ; reared on Willow.

Coccinata Grote, rare.

Unijuga Walk., not abundant ; appears late ; one specimen taken
October 6th.

Group 3—Secondaries yellow with black bands or band :

Neogama Guen., abundant ; reared on Walnut.

Subnata Grote, not rare.

Piatrix Grote, abundant.

Palaeogama Guen., very abundant.

Var. Phalanga Grote, not abundant.

Habilis Grote, not abundant.

Serena Edwards, not abundant.

Nebulosa Edwards, not rare in 1874.

Cerogama Guen., rare.

Illecta Walk., rare ; taken in July feeding on blossoms of *Catalpa*.

Grynea Cram., abundant ; appears early.

Minuta Edwards, not abundant.

Polygama Guen., not rare.

Var. Mira Grote, not abundant.

Var. Pretiosa Lintner, not abundant.

Fratercula G. & R., rare ; one specimen taken.

Androphila Guen., not abundant.

Var. Lineella Grote, not abundant.

Forty Species and Varieties.

NOTES ON NOCTUÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Segetia fidicularia Morr.

This species, which I have referred to *Caradrina* and as a synonym of *C. multifera* Walk., in the Check List, seems to me identical with the European *Caradrina cubicularis* S. V. A single European specimen of the latter has the common line beneath more extended, the hind wings whiter (♂'s compared) ; these characters are not, I think, likely to be constant. There are no other differences. I have a single poor Cali-

fornian specimen which may belong here. On page 13 of my Check List I would then make the following correction :

456. cubicularis (*S. V.*)

Segetia fidicularia Morrison.

? *Caradrina multifera* Walker.

Caradrina flavimaculata Harvey.

I have examined Dr. Harvey's type and a second Californian specimen. I regard both as extreme varieties of *Laphygma frugiperda* (Abb. & Sm.) In the Californian specimens the fore wings are dusty grey, pale, with only the stigmata obscure yellowish. This name, bearing the No. 1114 in my Check List, must then be referred to No. 358 among the synonymy.

Hadena interna Grote.

I find on a nearer comparison that this name is founded on a very dark specimen of *H. delicata* Grote, wanting the green shading on the reniform, costal region and subterminal line, which characterizes fresh specimens of *delicata*. The name, which is numbered 274 in my Check List, must then be referred as a synonym to No. 269.

Ipimorpha subvexa, n. s.

♂. This species is of an olive fuscous gray and resembles in color the European *subtusa*, but is very much larger and wants the claviform. The external pale margin to this spot is to be perceived in *pleonectusa*; this is not indicated in *subvexa*, which also has the orbicular much reduced. The t. p. line shows no bending on the subterminal fold, and it is slightly more outwardly rounded opposite the cell than in either of the allied species. The median yellowish lines are accompanied by dark edging as in the European *subtusa*. The s. t. line is accompanied by quite heavy preceding darker shading. Terminal line dotted, blackish. There is a faint median shade below the reniform. The basal-half line and t. a. line are further apart on costa than in *pleonectusa*. The stigmata are disproportionate, owing to the small size of the orbicular, which is much smaller than in *subtusa*. Hind wings fuscous with pale costal region and pale, faintly interlined fringes. Thorax and abdomen above olivaceous fuscous, concolorous with primaries. The t. a. line seems to show a faint notch on median vein.

Exp. 35 mil. *Hab.* Texas (Belfrage, May 12, No. 632).

Chytoryza, n. g.

♂ ♀. This form I would refer to the series of *Anomis*, *Aletia*, *Pteraetholix*. It much resembles the latter in size and color, but it differs by the external margin of the primaries being even, not sinuate, and the want of the ♂ venational characters. Eyes naked, prominent, legs unarmed, abdomen smooth, cylindrical, untufted; wings wide and ample, thorax smooth, untufted. The shape of the wings recalls *Poaphila*, but the apices are blunt, not pointed. Male antennæ simple, ciliate beneath slender.

Chytoryza tecta, n. s.

♂ ♀. Primaries cupreous brown with the lines fine, denticulate accompanied by whitish scales. Reniform conspicuous, being inferiorly filled in with white or yellowish scales, forming a prominent spot which strikes the eye at once. The upper portion of the reniform is obsoletely indicated. The brown shade of the subterminal space deepens up to the s. t. line, which is relieved outwardly by a fine powdering of pale scales, Fringes blackish, paler at the tips. Secondaries wholly blackish, without line, with fringes whitish at tips, at base obsoletely interlined. Beneath pale, hind wings irrorate, with a median denticulate line and small black discal mark preceded by an obsolete dash. Fore wings darker with the terminal space and costal region shaded with yellowish. Legs pale, thorax above like fore wings. *Expanse* 23 mil. Texas (O. Meske).

SYNONYMY OF THE COLEOPTERA OF THE FAUNA
BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

(Concluded).

274. *APOTOMUS ovatus* Fab. belongs to the genus *PTEROCOLUS*.
275. *Anthrribus fasciatus* Oliv. is a *TROPIDERES*.
276. *Chlamys plicata* Oliv.
277. *Cryptocephalus pubescens* Fab. is a *PACHYBRACHYS*.
278. " *notatus* Fab. is *SELLATUS* Suff.

279. *Eumolpis vitis* Fab. is correctly determined, but is an *ADOXUS*.
280. *Chrysomela philadelphica* Linn.
281. " *CONFINIS* Kby. is *C. spiraeae* Say and a variety of the, preceding.
282. " *BIGSBYANA* Kby.
283. " *multipunctata* Say.
284. " *CLIVICOLLIS* Kby. This name should remain. The *C. trimaculata* Fab. is the same, but the name was pre-occupied by Linneus.
285. " *rufipes* De Geer is *C. PALLIDA* Linn., a *GONIOCTENA*.
286. *Phaedon Adonidis* Pallas. is an *ENTOMOSCELIS*.
287. " *raphani* Fab. Probably a correct determination. The species is known in American cabinets as *GASTROPHYSA formosa* Say.
288. " *polygoni* Linn. is a *GASTROPHYSA*.
289. *Phyllodecta vitellinae* Linn.
290. *Haltica VICINA* Kby. appears to be *DISONYCHA ALTERNATA* Illig.
291. " *PUNCTICOLLIS* Kby. is *DISONYCHA TRIANGULARIS* Say.
292. *Galeruca OLIVIERI* Kby. is *PHYLLOBROTICA DECORATA* Say.
293. " *CANADENSIS* Kby. A *TRIRHABDA*, and Crotch thinks it a variety of *TOMENTOSA* Linn.
294. " *sagittariae* Gyll. This species and its allies form the genus *GALERUCELLA* Crotch.
295. " *BILINEATA* Kby. is a variety of *GALERUCELLA NOTULATA* Fab.
296. " *MARGINELLA* Kby. is a *GALERUCELLA*.
297. *Orsodacna TIBIALIS* Kby.
298. " *CHILDRENI* Kby. These two are considered identical, and the latter name adopted.
299. *Haemonia NIGRICORNIS* Kby. This seems to be the same as that subsequently described by Lacordaire as *Mel-sheimeri*. I have seen Canadian specimens which do not differ.
300. *Donacia FEMORALIS* Kby.
301. " *FLAVIPES* Kby.
302. " *AFFINIS* Kby. is *KIRBYI* Lac.
303. " *EMARGINATA* Kby.
304. " *PROXIMA* Kby.
305. " *CUPRÆA* Kby.

306. *Donacia* *HIRTICOLLIS* Kby.
 307. " *æqualis* Say.
 308. *Hispa* *bicolor* Oliv. is an *ODONTOTA*.
 309. *Coccinella* *EPISCOPALIS* Kby. is an *ANISOSTICTA*.
 310. " *tredecimpunctata* Linn. is a *HIPPODAMIA*.
 311. " *TRIDENS* Kby. is *HIPPODAMIA PARENTHESIS* Say.
 312. " *QUINQUESIGNATA* Kby. is a *HIPPODAMIA*.
 313. " *QUINQUENOTATA* Kby. In the revision of the *Coccinellidæ* Trans. Am. Ent. Soc., 1873, p. 370, Crotch allows the name to remain. In his general revision (published posthumously) London, 1874, the name is placed as a synonym of *TRANSVERSOGUTTATA*, which is probably correct.
 314. " *TRICUSPIS* Kby. In the London publication the name by Kirby is said to be pre-occupied and changed to *KIRBYI* by Crotch, but is allowed to remain in the American publication.
 315. " *INCARNATA* Kby. is *ANISOCALVIA DUODECIMMACULATA* Gebl.
 316. *Pimelia* *ALTERNATA* Kby. is *ELEODES TRICOSTATA* Say.
 317. *Upis* *ceramboides* Linn.
 318. *Tenebrio* *molitor* Linn.
 319. " *pensylvanicus* Kn. is a *NYCTOBATES*.
 320. *Diaperis* *bicornis* Ol. is a *HOPLOCEPHALA*.
 321. *Bolitophagus* *cornutus* Fab. is *BOLITOTHERUS BIFURCUS* Fab.
 322. " *OBCORDATUS* Kby. is a *PHELLOPSIS*.
 323. *MERACANTHA CANADENSIS* Kby. is *CONTRACTA* Beauv.
 324. *Arthromacra* *DONACIOIDES* Kby. is *AENEA* Say.
 325. *Cistela* *ERYTHROPA* Kby. is *ANDROCHIRUS luteipes* Lec., which is not rare in Canada.
 326. *Xylita* *buprestoides* Payk. *X. LAEVIGATA* Hellen. is an older name.
 327. *Notoxus* *monodon* Fab.
 328. *Cantharis* *UNICOLOR* Kby. is a *MACROBASIS*, *cinerea* || Fab. and *Fabricii* Lec. are its synonyms.
 329. *Meloe* *IMPRESSA* Kby.
 330. " *NIGRA* Kby.
 331. *Dasytes* *FOVEICOLLIS* Kby. is a *DOLICHOSOMA*.
 332. *Necrobia* *violacea* Linn. is a *CORYNETES*.

333. *Thanasimus ABDOMINALIS* Kby. is *nubilus* Klug, a variety of *UNDULATUS* Say.
334. *Cyphon FUSCICEPS* Kby.
335. *Telephorus ater* Linn. (Kby.) is erroneously determined and is *FRAXINI* Say.
336. " *WESTWOODII* Kby. The legs of this species are dark. It seems to me merely a variety of the next.
337. " *SAMOUELLII* Kby.
338. " *CURTISII* Kby. This and the preceding are the same.
339. " *PUNCTICOLLIS* Kby. is a *PODABRUS*.
340. " *LAEVICOLLIS* Kby. is a *PODABRUS*.
341. " *MANDIBULARIS* Kby. does not differ from *FRAXINI* Say.
342. " *BENNETHI* Kby. is *PODABRUS TRICOSTATUS* Say.
343. *Lampyris corrusca* Linn. is an *ELLYCHNIA*.

Synopsis of Kirby's Species.

Number of species described as new by Kirby.....	238
Those which retain Kirby's specific names and are known to us.....	111
Number which must be considered synonyms	108
Specific names pre-occupied and a more recent name used.....	6
Species in doubt and undetermined by us.....	10
To be dropped (name pre-occupied and type lost in one instance). ..	2
Two species mixed under one name.....	2
Number of species quoted from previous authors.....	105
Of these there are correctly determined.....	68
Those which must be placed in synonymy on account of incorrect determination or otherwise.....	35
Uncertain and unknown to us.....	2
Australian species described in error.. . . .	1

ON GENERA.

BY DR. H. HAGEN, CAMBRIDGE, MASS.

(Read before the Entomological Club of the A. A. A. S., at Buffalo, N. Y.)

There will hardly be a naturalist who has not spent considerable time to study the questions—What is a genus, and what are generic characters? Indeed, work is nearly impossible without having taken a position with regard to these questions. A full record of the literature, even the most condensed one, would be here out of place, but I have been induced by a recent and most surprising discovery bearing upon this question to make this communication. I have been speaking here only about *natural* genera. The consideration of the genus as an artificial division differs fundamentally, and to avoid mistake we should not call artificial divisions by this name. The characters of artificial genera depend solely upon the taste of the worker and the convenience of separating into groups animals and plants. All species are considered to belong to the same natural genus which agree in structural characters, external and internal, or anatomical ones in the different stages, in transformation, in the manner of living. These definitions of a genus are accepted as well by naturalists who are strong Darwinians as those who oppose the development theory. In a prize essay of the Jena University, D. P. Mayer, a pupil of Prof. Haeckel, in a paper on the "Ontogeny and Phylogeny of Insects," enlarges this definition in so far as he asks for a conformity in the embryological characters. I believe no one will object that this definition is a good and exhaustive one; but if we attempt to use it in a special case we become bewildered by the astonishing amount of characters unknown to us, and the impossibility to make them out for our work. At present we know hardly well enough the external characters of the imago. Of other characters our knowledge is merely fragmentary and often a *tabula rasa*. We may say that a century of hard work will not fill these gaps in our knowledge. It is obvious that we cannot wait till this enormous amount of work is done. And it is certain that naturalists will not and can not stop creating new genera.

Genera created with such a limited amount of knowledge will depend upon the experience and taste of the worker. Many of such genera will have to be modified or dropped by a farther advancing knowledge.

The most important question (what are generic characters?) is still unanswered.

The large literature and the difference of opinion emitted by prominent authorities seem to prove that a sufficient affirmative answer is impossible till our knowledge is further advanced. But here, as in other abstract questions, we can proceed in a negative manner by exclusion.

Genera consist of a number of related species. If we knew the character of the species, the specific character, we can by exclusion come nearer to the character of the genus. Species differ by structural character, and as the species form the lowest degree of the classification, we can be sure that species must differ at least by minutest points of structure.

I think there is no objection of consequence possible. I know very well that differences in minuter points of structure have been considered as generic characters. But naturalists beginning with the construction and definition of the higher degrees of class, order, family, &c., used up all characters at hand, till, coming to genera, nothing was left but minute differences of structure; the simple consequence of having used specific characters for generic ones was that nearly every species was considered to be a genus.

I said before that species must differ at least by minuter points of structure. The discovery which I mentioned before proves that structural characters of species are more important, and can by a different manner of living be changed in such a way as to represent forms which were formerly believed to belong to different genera. *Branchipus* and *Artemia*, belonging to the Phyllopod Crustacea, are represented by several species here and in Europe. The two genera are nearly related one to the other, and differ principally in the following points: *Artemia* has eight post-abdominal segments, the last one very long. *Branchipus* has nine post-abdominal segments, the last two of equal size. *Artemia* has three articulated claspers in the male; *Branchipus* two articulated claspers. *Artemia* is often propagated by Parthenogenesis, *Branchipus* never.

Nobody will deny that those characters of structure go very far beyond minuter points of structure, and are marked well enough to justify the separation sixty years ago by Dr. Leach. Now, it is proved that not only the species of *Artemia* known up to to-day from Europe, Asia and Africa, but even some species of *Branchipus* belong to one and the same genus and species. In the American fauna five species of *Artemia* and three of *Branchipus* are described; of course they will have to be studied again

in a similar manner as the European ones. The two European species of *Artemia* are remarkably different. *Artemia salina* has a strongly bifid tail surrounded by 15 to 20 bristles and narrow gills; *Artemia mulhausenii* has a rounded tail without bristles, and very large gills. This latter species lives in pools of a very concentrated salt water of 25° Beaumé; the other species in common salt water of about 8°. In 1871 a dam which surrounded a salt pool containing *Artemia mulhausenii*, broke down by accident and the sea water washed in at the same time; *Artemia salina*, which abounds in the sea water, appeared in large numbers in the pool. The dam was immediately repaired, and in the space of three years the amount of the salt in the pool arrived gradually at the same concentration as before.

A Russian naturalist, Mr. Schmaukevitch, living near the spot and studying carefully *Artemia*, was astonished to find the species somewhat changed in every following generation, till in three years the *Artemia salina* was changed entirely into *mulhausenii*. The fact was so extraordinary that he decided to confirm it by a more conclusive proof. He raised at home in open glass dishes *Artemia salina*, and by successive additions of salt to the water, he was able to transform the species into *Artemia mulhausenii*. To make the counter proof he diluted the water gradually and the species returned to the form of *Artemia salina*. But by continued dilution of the water he was more surprised to find that in the third generations the long abdominal segment began to be separated into two segments, and finally to be changed as in a *Branchipus*. He found later in salt pools of only four to five degrees (living together) *Artemia salina* and *Branchipus spinosa*, and in water with a lower degree of salt two other related species, *Branchipus ferox* and *media*.

Mr. Schmaukevitch has made similar experiments with similar results on *Daphnia*, *Cyclops* and *Canthocamptus*, which he has not yet published. There can be no doubt about the facts under such conclusive proof, and Prof. V. Siebold is now engaged in raising the American species from Salt Lake for similar experiments. These facts oblige us to consider all these different forms as belonging to one and the same species, since it is possible to change at will one form into another by altering the conditions of living. As long as this is possible they cannot be considered as differentiating or Darwinian species. We have now the proof that specific characters exist which do not depend on minuter points of structure. Therefore we are taught that we must considerably enlarge the characters of species and those of the genus.

What has been thus proven in Crustacea will certainly be observed also with other Articulates. Since insects do not possess a post-abdomen, there cannot occur the same differences as in the case cited, but analogous ones will not be wanting. It is obvious that so-called "salt insects" are the first ones which will need new and careful study. Those known are Coleoptera, Diptera, Hemiptera and Orthoptera, and the species are often nearly related to other ones which do not live in salt regions. Further, it is evident that similar changes will be the result of different conditions of life. So-called "local varieties" are certainly nothing else, and a vast field of observation and study is opened by the remarkable discoveries of Mr. Schmaukevitch. I believe that we are now justified when we exclude from generic characters all the following ones :

1. Every character based on the number of parts, when the number ceases to be a small one ; the more so when it varies in related species. If a number is larger than about a dozen, we can never rely upon the constancy of the number in antennal joints or anal appendages. In spines, bristles, spurs, a much smaller number is constant ; transversal veins of the wings belong to the same category.

2. The external coating of the body, consisting in hairs, scales and other appendages, is not a generic character. The hairs, tufts, brushes, spines, spurs, are often only sexual and can not be considered generic characters ; also, hairy eyes, since we find this character changing in the most related species and probably in the same species in Diptera.

3. The presence or want of the ocelli or eyes is not a generic character.

4. The veins of the wings give only to a certain degree generic characters, viz : the principal branches, but certainly not after their bifurcation.

Having arrived so far by exclusion, it is important to state what is left for generic characters.

So far as I am advanced in the study of generic characters, I think the following should be used :

1. The form and relation of the three principal parts of the body.
2. The organs providing nutrition (mouth parts).
3. The organs making possible the working of the mouth parts, *i. e.*, the organs of locomotion.

The anatomical characters may be of prominent help. At present our knowledge as to their details is too limited to admit our using them to a

profitable extent. We begin to be better acquainted with the previous stages, and this acquaintance will bring these characters into more prominence. I doubt embryological characters to be of generic value. But very little is certainly known about them, and nothing known is ready for our use. The parts serving for propagation have probably a higher value than generic characters. Characters for genera should be of a co-ordinate value. I think it is obvious that a genus should never be accepted if its characters are not satisfactorily given, and that genera based on the mere specification of a type should never be accepted.

CORRESPONDENCE.

DEAR SIR,—

In the early part of June I found on the Wax-Myrtle (*Myrica cerifera*) three larvæ unknown then to me. I regret now that want of time prevented me from making an accurate description of them, but my notes simply say: "Looks like a *Geometra*—may be small *Catocala*; prettily marked with dark grey; central segments underneath white or light grey."

Only one of the caterpillars produced an imago, and this proved to be *Catocala badia*. It was about fourteen days only in the chrysalis state, and I am now forced to the conclusion that *C. badia* must be double brooded.

W. V. ANDREWS.

P. S.—From what I have observed of the larval habits and appearance of *Catocala*, I am convinced that this genus should be very close to *Geometra*.

W. V. A.

Brooklyn, July 7th, 1876.

EXTRACT FROM A LETTER.

DEAR SIR,—

As an example of retarded development, let me mention that three or four years ago I laid aside some old cocoons of *Samia cynthia*, which I thought were empty, and to my amazement, three splendid specimens have this season made their appearance. I know that wonderful stories are told about the abnormally long continuance of some Coleoptera in the chrysalis form, but I never before observed a similar instance in Lepidoptera. Do you know of any?

How are you off for *Schaphinotus elevatus* up there in Ontario? A few days ago, in half an hour, I took thirty from under old railroad ties lying along the track. I was sufficiently *elevated* with my success for one day, and ceased further operations, lest I might exterminate the species!

J. C. MORRIS, Baltimore, Md.

IMPORTANT CAPTURES.

DEAR SIR,—

I made, as I think, a very important capture on the 26th of August which you and some of your readers may be interested in knowing, viz., two fine, fresh and absolutely perfect examples of *Catocala marmorata* Edwards. This is, I think, unquestionably the handsomest of all our known species of *Catocala*. I was not a little surprised, and as might well be imagined, delighted beyond measure to find two such unexpected strangers. My friend, Mr. Charles Dury, of Cincinnati, informs me in a letter received from him a few days ago that he also took one this season in his locality. A figure and description of this truly regal insect may be found in Strecker's work, Plate 9, No. 6. In a note accompanying his description he says: "One can but regret that so little concerning this fine species is known; the original description contains no further remarks than 'from Yerka, California,' and we can only hope that time, which 'at last sets all things even,' will enable us to receive specimens and learn more concerning this superb insect."

My specimens are both males; they were found on the trunks of two separate trees (White Wood or Tulip tree), fifty or sixty feet apart, about five feet from the ground, and both were started before I noticed them, but their flight was very short—only darting around to the opposite side of the tree, where they remained perfectly quiet until I covered them with the bottle.

The peculiar brown dash or band which obliquely traverses the primaries near the posterior extremity, is more dense in my specimens than is represented in Strecker's figure. Mr. Dury says in his it is quite black.

The abdomen of Mr. S.'s figure is, as he tells us, nearly imaginary, the specimen he had to work from not having any remaining, and he was not certain even as to which sex it belonged. The abdomen of mine is very much like *parta*, but heavier, and a shade darker. Length of body 1½ in.; diameter of abdomen in middle, 3½ lines. Anal brush white beneath and blackish above.

Both specimens are alike in size and expand $3\frac{1}{10}$ in. No one could fail to be impressed with the princely appearance of this rare insect, and unhesitatingly accord it the first rank among its peers in the interesting group to which it belongs.

Catocala have been very abundant here this season. I have taken between 900 and 1000 specimens, and among them some rare species and some that I seldom or never took here before. For example, I have taken *atarah* (as has also my friend, Mr. C. Whitney, in N. H.), which I believe has not been recorded before as occurring north of Texas. I have also taken *amasia*, and a species allied to it, which may prove to be an extreme variety. This also is put down in the published authorities as a southern species. Mr. Whitney informs me he also has taken this species in N. H. this season. And now *marmorata*, which hitherto has been known only as a Californian species. I have one, and perhaps two, that I think are new species, which I may give you a description of when I get time. After a while I may also prepare you a list of the species of *Catocala* occurring here.

JAMES ANGUS, West Farms, New York.

HOW DO SPECIALISTS PREFER TO RECEIVE MATERIAL?

DEAR SIR,—

Dr. Henri de Saussure writes in the introduction, page xix, to his Synopsis of "Solitary Wasps" (Amer. Wasps) as follows:

"In a great many collections it is usual to spread the wings and legs of the Hymenoptera. This is mere amateur's work, of no utility for study, sometimes even quite opposed to the purpose in view, by dissimulating the character of the insects instead of exposing it to view. This practice is to be regretted, moreover, by its increasing the value of the insects, on account of the time and expense wasted thereby, so that one is loathe afterwards to place them in the softener, when it becomes necessary to dissect the moth."

In connection with this, I would ask whether Dipterologists and Micro-lepidopterologists prefer things (to be sent to them for study) *spread* or merely pinned. Mr. V. T. Chambers is satisfied to get Tineidæ dead and dry, and even untouched by a pin. Let Mr. Cresson and other specialists announce their preferences. I should be glad to see published the names and addresses of such gentlemen as now are engaged in the study of Tortricidæ, Pyralidæ and Alucitæ, of which groups I will contribute all my accumulated Californian specimens without reserve.

JAS. BEHRENS, P. O. box 1,773, San Francisco, Cal.

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AN EXPERIMENT WITH A STINGING LARVA.

BY MISS MARY E. MURTFELDT, KIRKWOOD, ST. LOUIS, MO.

There is not in the whole group of caterpillars a more innocent and harmless-looking object than the larva of *Lagoa opercularis*—especially just previous to the fourth moult. As it reposes curled upon a leaf, with its long, wavy, white silken hairs the sport of the slightest zephyr, it resembles nothing so much as a tuft of the finest white cotton, and seems almost to invite the touch of caressing fingers. But let the unwary beware of meddling with that treacherous softness; they will find it a veritable “wolf in sheep’s clothing!”

I had upon several occasions tested upon my hands the prickles of various stinging larvæ, such as *Empretia stimulea*, *Callochloa viridis*, *Saturnia io* and *S. maia*, &c., without incurring more than a temporary smart, which, if severe, could be allayed by alkaline applications, as ammonia or a solution of soda. This being the case, I did not hesitate to undertake a similar experience with the larva of *Lagoa*, and one evening suffered the larva to be struck sharply against the little finger of my right hand, between the first and second joints. I felt the prickles pierce the skin, but for some time the irritation was but slight. As the evening advanced, however, the pain became severe and was accompanied by considerable inflammation and swelling of the finger. I then thought it advisable to apply some remedy, and tried first soda and then ammonia, but without the expected relief. I next resorted to arnica and camphor and finally to acids, but all in vain; the burning pain—exactly as though I held my finger against glowing coals—seemed rather to increase than diminish, and I felt that for once I was indeed a martyr to the desire (not my own, by the way!) for experimental knowledge. A night of sleepless suffering followed, and it was not until near morning that the pain subsided. No ill consequences followed except the peeling of the skin from

the part affected, but I have since experienced no inclination to cultivate a close acquaintance with this apparently innocent, but really formidable caterpillar.

After the last larval moult, as most Lepidopterists are aware, the larva of *Lagoa opercularis* presents an entirely different appearance from the one above described. The color is no longer white, but a dark gray, with fulvous or ochreous shadings on the dorsum and sides; the long hairs are replaced by a short and dense coating, resembling long-piled velvet, in which the stinging spines are more concealed than they were under the previous hairy coat. This larva is anomalous in one respect. It has, in addition to the four pairs of well-developed abdominal prolegs, two pairs of tubercles on joints 5 and 10, which are not only used as locomotive organs, but are actually provided with the rudiments of hooks.

THE PREPARATORY STAGES OF LYCAENA COMYNTAS.

BY W. H. EDWARDS, COALBURGH, W. VA.

Last year I observed a female *comyntas* depositing eggs upon *Desmodium Marilandicum* Gray, a common and troublesome weed in this region, called "shoestring" by the country people, from its toughness of stem, and bearing a sticking burr in the fall. On 9th July, 1876, I set a female in a bag over a stem of this plant, and several eggs were laid on the tender terminal leaves. Mr. Mead noticed that this butterfly laid also on red clover, and a number of eggs were obtained by the same process, on the 13th July, deposited on the young leaves and on the flowrets of the head. On the 12th, the eggs on *Desmodium* hatched; 15th, one larva passed 1st moult; 18th, the 2nd moult; 21st, the 3rd moult; on or about 26th, the 4th moult; made chrysalis 31st, and the butterfly emerged August 9th. I raised but one of this brood to maturity, but ten on the clover. The single larva was green in all its stages, and its chrysalis was green, but the larvæ on clover were reddish or red throughout, and their chrysalids were sordid white. Whether this difference was owing to the food plants further experiment must determine. The larvæ at first were such minute

objects as to be almost invisible, particularly on *Desmodium*, as both larva and plant were of nearly the same shade of green. On the clover they escaped sight down among the flowrets. Only by keeping them in small wine glasses could I have saved them. On clover, the tender leaves were rapidly eaten by the very young larvæ, a single larva eating out two or three furrows the width of its body, and side by side. As they became larger they seemed to feed on the calyces of the flowrets exclusively, curving themselves to the surface of the clover head, or burrowing into it. On *Desmodium*, as there were no flowers in bloom, only the tender leaves and immature flower buds were eaten. When about to change to chrysalis the larva rested motionless for several hours, usually on the upper surface of a leaf, the green shade becoming gradually yellowish, then red, rusty brown, and a loop was thrown over the body almost mid-length. When the change had occurred, the shape and appearance of the green chrysalis was so like that of the larva as to require some inspection to discover whether it was a chrysalis or no, lying flat on the leaf, the upper side rounded and of almost exactly the larval shape. To make the resemblance still closer, the chrysalis is as hairy as is the larva. I believe that wherever *comyntas* is found, two sizes of the butterfly appear, one of scarcely more than half the superficial area of the other. I do not know of any other species in which this peculiarity is regularly found. Both forms were among the butterflies from these chrysalids. The species is also dimorphic in the female, most of this sex here being black, the others blue with broad black margins. This phenomenon is similar to that of *Pseudargiolus* in its winter form *violacea*. At Coalburgh, there must be several successive broods of *comyntas* during the season, as fresh individuals are seen every month from April to September.

I subjoin a description of the several stages :

EGG ; round, flattened, depressed at top, covered with a frost work of interlaced points ; in color delicate green.

YOUNG LARVA ; length .05 inch ; shape rather cylindrical ; color yellowish, excepting a few white tuberculated points on dorsum, arranged in two longitudinal rows ; a similar row at base of body ; from each of all these points arises a long, curved, white hair ; head nearly as broad as second segment, black, shining, retractile.

Following the larva which fed on *Desmodium* :

After FIRST MOULT ; length .08 inch ; onisciform, flattened, the dorsum flat at top, sloping towards base of body ; color greenish ; the

whole surface irregularly dotted with black ; and from most, but not all, of the dots come white hairs, those on dorsum curved back, those nearer base curved partly downward and partly back ; head obovate, long and narrow, smaller in proportion to 2nd segment than at last stage, and partly concealed, even when active, in second segment ; color black.

After SECOND MOULT ; length .12 inch ; broader and flatter than before ; on each side of the narrow dorsal ridge a slightly raised edge, caused by the tubercles ; at the base of the body a fold, and the hairs from this and the ridge are longer than elsewhere ; whole surface finely pilose ; color green, but with a rusty tint caused by the numerous reddish points ; above the fold these take the form of a line or slight stripe ; at this stage the division of the segments becomes distinctly apparent.

After THIRD MOULT ; length .20 inch ; color clear apple green, the crests of the dorsal ridge, and also the fold at base, whitish ; on either side of the white line thus caused at the fold, on several of the segments after the middle, but not on the two last, is a reddish line ; there is also an indistinct double oblique line of pale green on side of each segment ; head as at last stage.

After FOURTH MOULT ; length .36 inch, greatest breadth .10 inch ; onisciform, high anteriorly, the back rounded and sloping to last segment, which is much flattened ; both ends (when the head is retracted) rounded equally, or nearly so ; each segment rounded dorsally ; the whole upper surface covered with fine white hairs ; color emerald green with very many yellow tuberculous points ; along middle of dorsum a deep green stripe in a depression ; at base a whitish line edged with vinous on three or four segments after the middle ; under side and legs pale green ; head .025 inch in breadth, longer than broad, obovate, shining black, seen through the 2nd segment when half protracted.

• CHRYSALIS ; length .26 inch ; greatest breadth .10 ; shaped much like the mature larva, rounded at each end, tapering on the sides somewhat from segments 5 and 6 to head, roundly carinated dorsally, flattened on under side ; the mesonotum but slightly prominent ; color emerald green, except the abdomen both above and below, which is yellowish green ; a dark green medio-dorsal stripe from end to end, and on either side of this a row of small round black spots, nearly the whole length ; much covered with fine white hairs ; on the top and sides of the anterior segments the hairs are conspicuously longer, and are arranged in tufts, and similar hairs form a connected fringe quite round the abdomen.

The larvæ which fed on clover differed in coloration as follows: color russet varying towards vinous, interspersed with green; at third moult some were pale green dorsally, the white being caused by the tubercles, the sides vinous; the dorsal stripe vinous, and the oblique lines vinous; others had the back as well as sides vinous, and this variation and character followed to maturity. The chrysalids of these larvae were sordid white on the whole upper surface and lower side of abdomen, the former specked with brown; the medio-dorsal stripe was brown, as were also the dots; under side of thorax and of head case, and the whole of the wing cases apple green.

NOTES ON CERTAIN SPECIES OF MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Phyprosopus callitrichoides Grote.

Prof. Zeller published this species subsequently under the generic name of *Sudariophora*, which I, afterwards, adopted in lieu of my own. Prof. Zeller, however, now states that the generic character upon which he founded the name *Sudariophora* does not exist in reality. Accordingly, I now revert to the earlier name for the genus. The insect was erroneously identified as *Doryodes acutaria* by Mr. Walker, and referred by him to the Pyralidæ in the British Museum lists, where it is recorded as *Doryodes acutalis*. It does not seem to have been separately named before I described it. Dr. Packard discusses the position of the species in his work on the *Geometræ*, p. 33, and finds that "the palpi are truly noctuidiform, as well as the shape of the wings." In criticising Prof. Zeller's classification of the moth, Dr. Packard omits to state that I had described it previously under the Noctuidæ. Consult Zeller, Beitr., 328-9.

Caterva catenaria (Drury).

The new generic name is proposed since our species is generically distinct from the European forms referred to *Zerene* Treits., a genus which,

according to Stephens, is equivalent to *Bupalus* of Leach. *C. catenaria* occurs in the autumn in various localities in New York State and Pennsylvania, according to our observations. It flies sluggishly in the day time, and collects in numbers about clumps of bushes in fields.

Epimecis hortaria (Fabr.).

In a list of N. Am. Geometræ which I have in MSS., this name is retained instead of *Bronchelia hortaria* Guen. The name is proposed in the Verzeichniss for this and another species, the European *umbraria*, which, however, belongs to *Cymatophora* (*Boarmia*), leaving the designation for *hortaria*.

Homopyralis discalis, n. s.

♂ ♀. This is a slightly larger form than *tactus*, and instead of the even brown color of that species, the wings are olivaceous and paler, contrasting with the lines and shadings, which are disposed as in its ally. The pale ground color appears on the extra basal space; the black orbicular is evident. Pale cuneiform spots accompany the t. p. line externally, as well as the black dotted terminal line. There is on the cell of fore wings, and more evidently on hind wings, a reddish shade beyond the stigmata. Beneath paler than in *tactus*. Exp. 26-28 mil. New York State (O. Meske; Geo. W. Peck).

Conchylis argentifurcatana, n. s.

Allied to *Ridingsana*. Fore wings olive brown with the internal margin silver striped. From the base to the middle of the wing a silver stripe runs centrally, terminating pointedly. This median stripe is joined to the costa at basal third and coalesces here with the oblique costal stripe, which runs downwardly and outwardly. The lower edge of the median stripe is produced downwardly somewhat squarely before its outer extremity. An irregular silver patch above anal angle. A minute silver dot beyond the first costal stripe. The costa at base is concolorous, not silvery. A sub-apical trigonate patch and a terminal apical discontinued silver band. Hind wings and abdomen fuscous, with paler fringes. This species differs from *Ridingsana* by the shape of the median stripe, which bulges downwardly at about the middle of the wing and sends a branch upwards to costa, coalescing with the oblique costal stripe. Two specimens, from W. Saunders, London, Ont.; taken at Port Stanley, Ont. Expanse 1.55 inch.

Conchylis hipeana, n. s.

Allied to *argentifurcatana*. Ochreous brown; the silver markings rather distinctly outlined in black. Internal margin striped with silver. Before anal angle a silver dot. Median stripe as in *argentifurcatana*, while the inferior bulged prolongation is wider, preceded by a notch of dark scales. An irregular silver patch above anal angle. Costa at base with a silver stripe terminating before the usual oblique costal stripe. A silver spot between this latter and the usual sub-apical trigonate patch. A terminal apical discontinuous silver band. Hind wings and abdomen pale fuscous with whitish fringes. This species differs by the costa being silvery from the base outwardly and by the median stripe not being joined to the first oblique costal stripe by a furcation. One specimen, from W. Saunders, London, Ont.; taken at Port Stanley, Ont. Expanse 1.55 inch.

Eustrotia caduca, n. s.

Among the species of Noctuidæ which I have recently been able to examine is a species of *Eustrotia* reared by Prof. Kellicott from larvæ feeding on the Yellow Pond Lily (*Nuphar advena*), and which I propose to call *Eustrotia caduca*. At first sight it looks like a very large *E. apicosa* (= *nigritula* Guen.), but the differences in ornamentation are at once perceivable on comparison. The colors and their disposition are similar. From the base to the t. p. line the wing is purplish brown, deepening outwardly in tone. The t. a. line is waved. Both stigmata are perceivable, the reniform rather large and quadrate, not oblique as in *apicosa*; they are leather brown in color, as is the terminal portion of the wing beyond the t. p. line. The shaded subterminal line is indented opposite the cell. The fringes are blackish, checkered with leather brown. The hind wings are fuscous, shaded with brown, and with double, faint mesial lines. Head and thorax leather brown. Beneath brighter brown with black discal mark on hind wings, double lines, the disc of the fore wings blackish. The moth expands 28 m. m. Hab. Jackson Co., Michigan.

Selenis monotropa, n. s.

Two fresh specimens, similar in appearance, but evidently of opposite sex from the structure of the frenulum. The male has not the hind tarsi covered with thick scales; but the fore legs are thickly covered with blackish hair, concealing a pale tibial tufting. Wings brownish black with a broad gray costal margin to the fore wings, widening to the base

of the wing, where it attains internal margin, and spreading across the hind part of the thorax. It is darker shaded, somewhat brownish anteriorly. Collar dead black. The black lines are indicated on the gray costal margin. Orbicular a minute dot. Reniform strongly indicated, surrounded with the pale shading of costal margin. T. p. line continuous, reddish brown where it crosses the gray margin, and here angulate, black below and strongly marked, a little dentate. Subterminal line followed by an interrupted reddish brown shading. Terminal line black, festooned, followed by a pale thread-like line at base of fringes, which latter are blackish. The denticulate black t. p. line continued across hind wings, which agree with the primaries. Over the middle of the wings are two or three blackish shade lines representing the median shade and t. a. line. Beneath a little paler, with small discal marks, white centered. Feet dotted with white; abdomen blackish. Expanse 31 mil. Hab. Bastrop Co. (O. Meske).

This species seems to be allied to *Selenis lanipes* Guen., of unknown locality. It appears to differ decidedly in color, the continuous black transverse posterior line, and the absence of the multitude of parallel, denticulate, unequal violet gray, reddish and black lines, crossing the wings in *lanipes*. There is also the absence of any sexual character in the clothing of the hind tarsi, unless I have made a mistake in my determination, which, after re-examining both hind wings, I think is not the case. The "ligne coudeé" is, instead of being continuous and evenly strong as in *monotropa*, "indiquéé par des traits noirs plus épais, fondus inferieurement," in *lanipes*. Gueneé's figure represents a similarly sized but much higher colored insect than the one I describe, and I do not think there is any reasonable doubt that they are different species.

NOTES ON THE OCCURRENCE OF ARGYNNIS IDALIA DRURY.

BY H. H. LYMAN, MONTREAL, P. Q.

Mr. W. H. Edwards, in his article on *Argynnis myrina*, published on page 189 of Vol. vii, of the CANADIAN ENTOMOLOGIST, says that in all the species of butterflies which he has made observations on, except *Apatura clyton*, the females emerge as early as the males, and in the course

of the same article he mentions having "bred from the egg four of our larger species of *Argynnis*, viz., *diana*, *cybele*, *aphrodite* and *idalia*."

Does *A. idalia* occur in Mr. Edwards' neighborhood, and to what extent has he obtained the imagines from eggs? The only other reference by him in the CAN. ENT. to *A. idalia*, that I can find, is on page 151 of Vol. vii, where he states that Mr. G. M. Dodge had sent him several eggs of this species from Nebraska, and that he had succeeded in carrying a few of the larvæ through the winter and one past the fifth moult, but that this one *died before chrysalis*.

Though I do not presume to question the statements of so distinguished an Entomologist as Mr. Edwards, I thought that I would give my experience with regard to this butterfly, and I should like to know whether any one else has had a similar experience.

I may state that I have collected for eight successive summers on Cape Elizabeth, in the vicinity of Portland, Me., where this butterfly occurs every season, and though generally not common, is sometimes somewhat plentiful.

My experience has been that, though I might find a stray female almost as early as the males, the great majority of females did not appear for a week or ten days after the males. It is only within the last three years that I have kept an entomological diary and numbered my specimens, so that I cannot give any figures with regard to those taken or observed before 1873, but I remember noticing the fact previous to that date; however, this species was tolerably abundant during the past season (1875), and I can give some dates in support of what I say.

By referring to my journal for this year, I find that I took the first ♂ of the season on 20th July, three more on July 24th, on which day I also caught one ♀, and from July 20th to 31st I took altogether 10 ♂ and 1 ♀. Unfortunately the weather during the first half of August was very bad, almost every day being foggy or rainy, or both, so that I am unable to state when the females emerged.

On one partially fine day, Aug. 9th, I obtained another ♂, and during the last half of August worn females were obtainable, but they were too poor for cabinet specimens.

In 1874 this species was very scarce, and I only obtained two specimens, ♂ on July 28th, and a badly rubbed ♀ on Sept. 3rd.

In 1873 it was also scarce and I only took two ♂, one on July 16th and another on the 17th. Of course the cases of 1873 and '74 would

not prove anything, as the number taken was so small, although the last two dates are a good deal earlier than I ever remember to have seen a female, but I consider that the captures of the past season afford strong evidence in favor of the opinion that the males of this species appear at least a week or ten days before the females.

ANNUAL ADDRESS OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

To the Members of the Entomological Society of Ontario :

GENTLEMEN,—In accordance with time-honored usage, it devolves upon your retiring President at the close of another year of the existence of our Society to offer you a few remarks bearing upon the objects and interests of our body, or of Entomology in general.

And first, gentlemen, I desire to congratulate you on the continued prosperity of our Society and the increasing interest felt and manifested in the furtherance of the chief objects we as an organization have in view, viz., the diffusion of practical information in reference to the life history and habits of our insects, so that we may be able to distinguish our friends from our foes, and thus be placed in a position to apply intelligently such remedial measures for the check of insect ravages as experience may suggest to be most practical and effective.

During the past year circumstances have arisen which have brought our Society more prominently before our people than ever before, notably the fact of the accumulation of that grand collection of Canadian insects which we have prepared and forwarded to the Centennial Exhibition in Philadelphia. My esteemed predecessor, in his annual address last year in Toronto, referred to this proposed work, and expressed himself as confidently anticipating the active co-operation of our members in all sections of our country. The result has more than realized our fondest hopes; our members entered most heartily into the work, bringing together a collection of Canadian insects far surpassing anything ever before seen. The carrying out of the details of this work was entrusted last year to a special committee, consisting of Messrs. Bethune, Saunders and McMechan, and upon consultation it was resolved to accumulate all

the material for this collection at the Society's headquarters in London, and there make such selections from the insects sent as might seem desirable. All our members in London who had collections freely placed them entirely at the disposal of the committee, while many of those resident in other localities throughout the country expressed their readiness to contribute anything or everything in their power to fill up blanks in the desired series of specimens.

As is usual in such cases, the bulk of the work of arranging, classifying and labelling specimens fell upon a few individuals. It affords me much pleasure to have the opportunity of naming especially *one* who has labored most assiduously and has contributed more than any other person towards the success of this enterprise; I allude to my esteemed friend, Mr. Johnson Pettit, of Grimsby, who arranged the entire collection of Coleoptera and freely contributed from his own stores—the accumulation of years—a large proportion of the specimens. The extreme neatness and care manifested by him in the mounting and arrangement of the insects has been the admiration of all, and some idea of the accuracy of his determinations may be arrived at when I say that such authorities as Dr. Horn and Dr. LeConte, of Philadelphia, after a critical scrutiny of the whole series of Coleoptera, filling some twenty-seven cases in all, could only detect two or three errors, and these among the smallest and least conspicuous specimens; such results reflect great credit on the labors of our esteemed coadjutor. In the arrangement of the other departments, your President was ably aided by several gentlemen, notably Messrs. E. B. Reed, J. M. Denton and G. Geddes, of London; indeed, all our London members were ever ready to render all the assistance in their power.

The expenses necessarily attendant on this work have been considerable. The making and lining of suitable cases in which to display the insects, the printing of labels, &c., and the numberless outlays entailed by the transmission of specimens to and fro from all parts of the country, as well as many other incidentals which it is needless to enumerate here, combined, have involved a large outlay. This has been chiefly met by a special grant of five hundred dollars from the Government of Ontario, the remainder being drawn from the Society's resources.

To make the collection as perfect as possible, as far as accurate naming is concerned, the doubtful specimens in the orders most largely represented were submitted to the examination and correction of specialists. The entire collection of Lepidoptera was carefully gone over by Prof. A.

R. Grote, of Buffalo, who generously placed his services at the disposal of the Society for this purpose, and twice visited London in order to complete the work. Dr. Horn also kindly rendered all possible aid in the determination of such Coleoptera as were submitted to him, and to Dr. A. S. Packard we are indebted for naming some of the Geometridæ.

The collection arrived safely and in good condition in Philadelphia, where it at once attracted much attention. The whole display consisted of eighty-six glass cases, forty-five of which were filled with Lepidoptera, twenty-seven with Coleoptera, and the remaining fourteen occupied by the other orders, the whole arranged in a double row on a suitable stand *seventy-six* feet in length, in the Canadian Department in Agricultural Hall.

There were no other collections on exhibition in Philadelphia which would compare favorably with that sent by our Society. There was a very good one in the United States Government Building, from the Department of Agriculture in Washington, arranged by Prof. Townend Glover; this, however, consisted chiefly of Lepidoptera.

There was a small collection shown in the Canadian Department, adjoining that of our Society, consisting of four or five cases, containing Canadian insects representing the various orders; they came, I believe, from Montreal, but I did not succeed in finding the name of the party to whom they belonged. Through the neglect or carelessness of our Canadian Commission, neither this collection nor that of our own Society *are mentioned* in the official catalogue, do not appear to have been entered as belonging to any department of the exhibition, and hence were not examined at all by the Centennial judges. Had it been otherwise, we should no doubt have been honored with awards which, in the case of our Society, if we may judge from the laudatory comments of those best able to form an opinion, were well deserved.

In the Kansas State Building there was a collection from the State Board of Agriculture arranged by Prof. Snow, consisting of thirty cases, sixteen of Lepidoptera (seven of butterflies and nine of moths), five of Coleoptera, two Neuroptera, two Orthoptera, three Hymenoptera, one Diptera and one Hemiptera. These were very well set up, classified, and nearly all named, and were very creditable to Prof. Snow and the Board by whom they were sent. There was, nevertheless, one drawback to viewing them with any satisfaction; the dust was allowed to accumulate on the glasses to such an extent as to obscure the objects contained.

There was a collection from Brazil, shown in the Brazilian Department in the Main Building. This, we were told, was the work and property of a private gentleman residing in Rio Janeiro ; it was arranged in thirty-five cases, thirty-one of which were Coleoptera and four Lepidoptera. This collection was very much mixed ; there was no attempt made to name the insects, excepting to the extent of partially indicating the family names. Neither was there much effort towards a correct classification ; they seemed to be partly arranged with regard to their natural relationships and partly with the view of display. Among the butterflies and moths there were some superb specimens whose brilliance attracted much attention. There were also some very beautiful and interesting things among the Coleoptera. The Curculionidæ were very brilliant and numerous in species, with forms greatly varied ; the Cerambycidæ were also remarkable, handsome, and largely represented, some of them of great size. We noticed one enormous *Prionus* fully six inches long ; the *Cetonias* were also very beautiful. Some of the Buprestidæ were wonderfully brilliant with metallic shadings, and the Chrysomelidæ very numerous and some of them very charming, the Cassidæ being largely represented. Among the Scarabeidæ there were some enormous specimens, among others, species of *Copris* with remarkable horns, and some brilliant species of *Onthophagus* ; there were also a number of very handsome *Elaters*. One of the rarities in this collection was a fine example of *Hypsaphalus armatus*, an extremely rare insect about two inches in length, and of which it is said there are only two or three known specimens in collections. The more brilliant Brazilian insects, especially the Coleoptera, are largely employed by the inhabitants of that country in the ornamentation of jewelry and other fancy articles, often associated in the latter case with the feathers from their brilliant plumaged birds.

In the Department of Queensland there was a large case, filled chiefly with Lepidoptera in a fine state of preservation, embracing many very beautiful and strange looking things ; almost the only familiar objects among them were specimens of *Danaï archippus*. In this instance, also, none of the specimens were named, which detracted greatly from the interest which would otherwise have attached to them. We learned that this collection had been sold for \$150 to Mrs. Bridgham, of New York, a lady who, we believe, takes a deep interest in Entomology and who has a very large and handsome collection of Lepidoptera.

The Orange Free State of South Africa exhibited two cases of insects,

among which there was a curious admixture of millipedes, scorpions and spiders, arranged in a semi-ornamental manner. One case contained chiefly Coleoptera, with a few Hymenoptera, Hemiptera and Orthoptera. Among the Coleoptera there were some curious and beautiful forms, especially among the Cetonidae and Cerambycidae; also some handsome Scarabeans, Chrysomelans and Curculios. The second case was filled mainly with butterflies, among which there were a few very handsome ones. That cosmopolitan species, "the painted lady," *Cynthia cardui*, was represented by several specimens; there was also a *Sphinx* closely resembling the death-head moth of Europe, and a *Utethesia* very like our *bella*. Besides these there were a number of very curious and handsome moths, with a few Orthoptera and Neuroptera. No attempt was made in the way of naming anything in this collection, nor any effort at classification.

An American gentleman, whose name I did not learn, had a very curious exhibit of insects in Agricultural Hall, of a purely ornamental character, in three cases. One was a circular arrangement, and was built up chiefly with butterflies and moths; the other two represented public buildings and were constructed of beetles; the specimens were immensely numerous and well preserved; the whole arrangement indicating great ingenuity and perseverance on the part of the collector.

India had a very fine exhibit of silks, raw and manufactured, with the insects and cocoons from which they were obtained. The Tusseh silk-worm moth, *Antherae paphia*, is very handsome, not unlike our *polyphemus*; the cocoon is egg-shaped, and yields a very strong looking silk. The *Bombyx Huttonii*, or wild silk-worm moth, is also very pretty; in form it resembles *B. mori*, but its wings are beautifully marked and tipped with brown.

It was very gratifying to observe the prominence given to the study of Natural History in the Educational Departments of many of the nations thus represented at the Centennial. Nearly all of them had small collections illustrating the course of teaching in this branch of study, and in nearly every instance Entomology occupied a prominent position. In the model schools of Sweden and Belgium this was very noticeable; also in the Russian exhibit, where there were cases of insects of all orders, including in many instances the blown larvae very neatly set up. In the same department in the Japan exhibit there were similar cases fairly classified, illustrating the various orders. The Chinese make use of

insects, too, but with them they are used as medicines; among their *materia medica* collections we observed dried caterpillars, the empty pupa cases of a species of *Cicada*, and other similar substances, all extolled as possessing rare medical virtues.

The bringing together of such an immense number of agricultural productions as are now on exhibition in Philadelphia, including almost every variety of grain, peas, beans and other useful productions on the face of the globe, affords a favorable opportunity for the introduction of any insect pests which may infest these articles in the country of their growth; these, if introduced and acclimatized, may attack similar or related products in this country, unless precautions are taken against their dissemination, and thus we may have new foes to fight which may be very difficult to contend with. The American Centennial Commission, who do not seem to have overlooked anything, have, with wise foresight, appointed a special Commission of eminent Entomologists to report on the insects introduced along with the products exhibited. This report will be looked forward to with much interest by agriculturists as well as Entomologists.

The Agricultural Building, in which our insects were shown, was well supplied with skylights, which admitted a flood of light on everything below. Exposure to this brilliant light for so many months has had a damaging effect on the colors of some of our Lepidoptera, the moths being much more faded than the butterflies; this fading is especially noticeable in insects having any red colors on their wings, such as the Catocalas and Arctians; many of these, however, can be replaced without much difficulty.

Suitable arrangements have been made for the careful packing and re-shipping of the insects at the close of the Exhibition, when they will be forwarded to the Society's rooms in London, Ont. Here it is proposed to keep the collection as far as possible undisturbed, where it will serve a good purpose as a collection of reference for collectors to name their specimens from. Mr. Pettit has kindly consented to allow all that he has contributed to remain in the Society's rooms, and all the London members will follow his example. Mr. Wm. Couper, of Montreal, has generously donated all he has sent to the Society, and I doubt not that most of our other friends in Montreal and elsewhere, who have contributed to the collection, will allow such of their insects as are not represented in our cabinets in London, to remain at least for a time, when no doubt most of them could be replaced. The advantages which will result to our

Society from the possession of a collection so well worked up and so correctly named, can scarcely be over estimated, affording as it will conveniences to collectors for naming specimens such as we have never had before. If for no other reason, we shall, in the possession of these advantages, always have cause to remember with pleasure the hundredth anniversary of American independence.

The continuance of the organ of our Society, the CANADIAN ENTOMOLOGIST, has also contributed greatly to the maintenance of the interest felt in our Society. During the past year important matters have been discussed in its pages, and a mass of new facts, throwing light on the habits and life history of many of our insects, placed before our readers. Much space has also been given to the important department of descriptive Entomology. Indeed, I scarcely think we should be deemed presumptuous in saying that our little journal is an important bond which does much to bind together the brotherhood of Entomologists throughout America.

The recent action of American Entomologists on the subject of Entomological nomenclature claims more than a passing notice. At the meetings of the Entomological Club of the American Association for the Advancement of Science, held last month in Buffalo, N. Y., this important subject was discussed and conclusions reached in reference to it which, I hope, will greatly tend to the stability of our nomenclature, the great end and aim which all parties claim to have in view. Amidst the conflicting opinions held by leading Entomologists on this subject, it was scarcely to be expected that entire unanimity could be secured; but it was most gratifying to notice the conciliatory spirit manifested by all, and the desire apparently as far as possible, to meet each other's views. A series of resolutions touching on important points was presented by the committee named last year to report on this subject, and on some of these they were unanimous, while on others there was a divided opinion. Those rules which were unanimously adopted will, it is understood, be strictly carried out by all who were present, while those on which there was expressed a divided opinion will, in the meantime, be left to be acted on or not, as the individual choice may dictate. Although this does not leave the subject in as satisfactory a state as entire unanimity would have done, still it was felt that by the action taken very much had been done towards settling some of the disturbing elements which interfere with the fixity of nomenclature. A report of these important meetings will be found in the

ENTOMOLOGIST ; we commend them to the careful perusal of our readers. Our own Society was well represented in this gathering by the presence of the Rev. C. J. S. Bethune, M. A., E. Baynes Reed and your President.

I shall not attempt, gentlemen, to trespass longer on your time and patience. Thanking you for your kind partiality in electing me to fill so important an office among you,

I have the honor to be very sincerely yours,

WM. SAUNDERS.

London, September, 1876.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

LITHARIAPTERYX, *gen nov.*

L. abroniælla. *N. sp.* (Or, as it may be popularly translated—the delicate little gem-wing, or gem-wing of the *abronia*.)

This insect is interesting not only for the elegance of its adornment, but equally so for the relation it bears to other genera of the *Glyphipterygidae*. Comparing it with *Glyphipteryx fuscoviridella*, *G. thrasonella*, *Æchmia dentella*, *Perittia obscuripunctella*, and *Tenagma serriciellum*, its relationship to them may be thus stated : Lacking some of the characters of each genus, it combines many of each. Like *Tenagma* and unlike the others, it has the submedian vein of the fore wings not furcate at the base ; the form of wings is almost exactly as in *Æchmia*, but not quite so wide, and the tuft of scales projecting from the hind margin in *Æchmia* is absent ; the neuration of the fore wings is almost exactly as in *Æchmia*, except that, as above stated, the submedian is simple in this species, and there is a distinct secondary cell as in *Glyphipteryx*. The neuration of the hind wings resembles that of *Tenagma*, the cell being unclosed, but this species has the submedian furcate on the margin and two independent discal veins going to the hind margin, instead of one, as in *Tenagma* (or it would resemble the neuration of the hind wings of *Æchmia* if the discal vein, the submedian and the first branch of the median were absent in that genus.) The characters of the head and its appendages are very

nearly as in *Perittia*, but this insect has the tongue longer and scaled at the base only ; as in *Perittia*, there are no ocelli, and no maxillary palpi, the labial palpi (recurved in the living, porrected or drooping in the dead insect) do not over-arch the vertex, but reach only about to the base of the antennae, and taper gradually from the base to the apex, with the articulations indistinct ; the antennae are simple, rather slender, and a little more than half as long as the wings. The ornamentation, though quite distinct from all other *Glyphipterygidae*, yet reminds one of *Glyphipteryx* by the smooth elevations of violaceous metallic spots, and of Dr. Clemens' genus *Hybroma*, by the dark streak along the base of the costa. Thus the head and its appendages ally this species to *Perittia* ; the wings to *Aechmia*, and less closely to *Tenagma*, while the secondary cell of the fore wings and the ornamentation ally it more remotely to *Glyphipteryx* ; the characters of the larva also ally it to *Glyphipteryx*, but the larvae of the other genera mentioned above are unknown.

Palpi, head and antennae like polished silver, the antennae annulate with brown ; fore wings appearing to the unaided eye silver gray as far as the ciliae, and the apical portion ochreous or golden, according to the light, but under a lens the silver gray portion is resolved into a multitude of narrow wavy lines, alternately white and black, which cross the entire breadth of the wing ; the costal margin from the base to about the basal fourth is velvety black, interrupted by two smooth metallic violaceous streaks, nearly perpendicular to the margin and appearing to be raised a little above the surface, and there is another on the extreme base of the costa which is almost concealed by the patagia (or instead of this, we may say there are three metallic violaceous spots, each widely margined by velvety black, the posterior black margin of each confluent with the anterior black margin of the succeeding one) ; a *very little* further back and still before the middle of the wing length, is another velvety black spot (the fourth, counting the one on the base), containing another metallic violaceous spot, and nearly opposite to this, but a little further back, is a velvety black dorsal spot, containing also a metallic violaceous spot, and further back on the costal margin, behind the middle, are two spots of smooth violaceous metallic raised scales, *not* margined with black, and opposite to the space between them, just within the dorsal margin, near the end of the cell, is another one also unmargined, and on the margin beneath it is a *small* white spot. In some lights all of the metallic violaceous spots appear simply white, and in the golden ochreous

apical part of the wing is a triangular white costal streak pointing obliquely *forwards* and ending in a small violaceous metallic spot. There are thus seven costal spots (including the one on the base), and two dorsal ones, the second dorsal being very small and white, and pointing to the infra-dorsal violaceous spot. Ciliæ fuscous, with a white line extending along the base of those of the dorsal margin. Hind wings purplish fuscous with long white ciliæ. Under surface of both pair purplish fuscous, with the three white costal streaks which are nearest to the apex showing through the wing. Upper surface of the abdomen shining black, each segment margined posteriorly with white; under surface silvery white, each segment narrowly margined anteriorly with black; anal tuft silvery white. *Al. ex.* 5 lines. Edgerton, Colorado; alt. over 6,000 feet.

The imago may be found in the afternoon in July, flitting about in the brilliant sunlight of that region, and alighting on the grass, or on the stalks of *Abronia fragrans*, which is very abundant, filling the air with its rich and delicate, though to me somewhat sickening, fragrance. (The statement in Prof. Gray's "School and Field Book of Botany," that the flowers of *A. fragrans* 'open at sunset' is incorrect, so far as I observed the species, as I have usually found the flowers fully open at all hours of the day. It is, however, more fragrant in the afternoon and evening, but I have never found the flowers frequented by any insect, otherwise than by an occasional visit from a small *Andrena*.) I never saw the species just described upon or in the flowers at any time. The larva resembles that of a *Glyphipteryx*, and mines the leaves of the *Abronia*, as I am fully convinced, though I did not succeed in rearing it, as all my specimens died after becoming pupæ. The moth and its larva are quite common. In twenty-five captured specimens I find no variation. The mine is irregular in shape, and the frass is ejected *usually* from the under side of the leaf, and sometimes there is a slight web on the outside of the leaf. It frequently abandons its old mine and constructs a new one, and once in confinement a well grown larva sewed two leaves together and fed upon them, though I never knew it to feed in this manner except in the breeding jar. It spins its cocoon in the sand. It is one of the prettiest of our 'Micros.'

BLASTOBASIS, Zell.

(HOLCOCERA, Clem).

B. gigantella. *N. sp.*

White; microscopically dusted with fuscous scales, and the course of

each vein of the fore wings distinctly marked by a fuscous line on the upper surface, so that the neuration is distinct without denuding the wings; abdomen creamy white, with a narrow transverse brown line on top of each segment, just before its hinder margin. *Al. ex.* 15½ lines; probably greater than that of any other species belonging to the *Tineina*. It is the only species in this group, observed by me, which seems to conform to the law said to be found among other insects and birds of increase in development of peripheral parts in the West. It seems to be a very local species, and of very sluggish habits. I met with it only once, but then found about twenty-five specimens mostly *in coitu*. They were all found resting on the blades of the soap weed, as it is popularly termed in Colorado (*Yucca*), and would require to be thrown violently off from the blade before they would move, but were very active on the wing when once aroused. All of them were found within an area not over one hundred feet square, in a field of about twenty-five acres, and I never saw it elsewhere. This field is on the road to Monument Park, about three miles north of Colorado Springs. The larva will probably be found to feed in some way on the *Yucca*. At all events, there was very little else in that particular locality on which it could feed. The wings are rather narrower in proportion to their length than in other species of the genus.

CORRESPONDENCE.

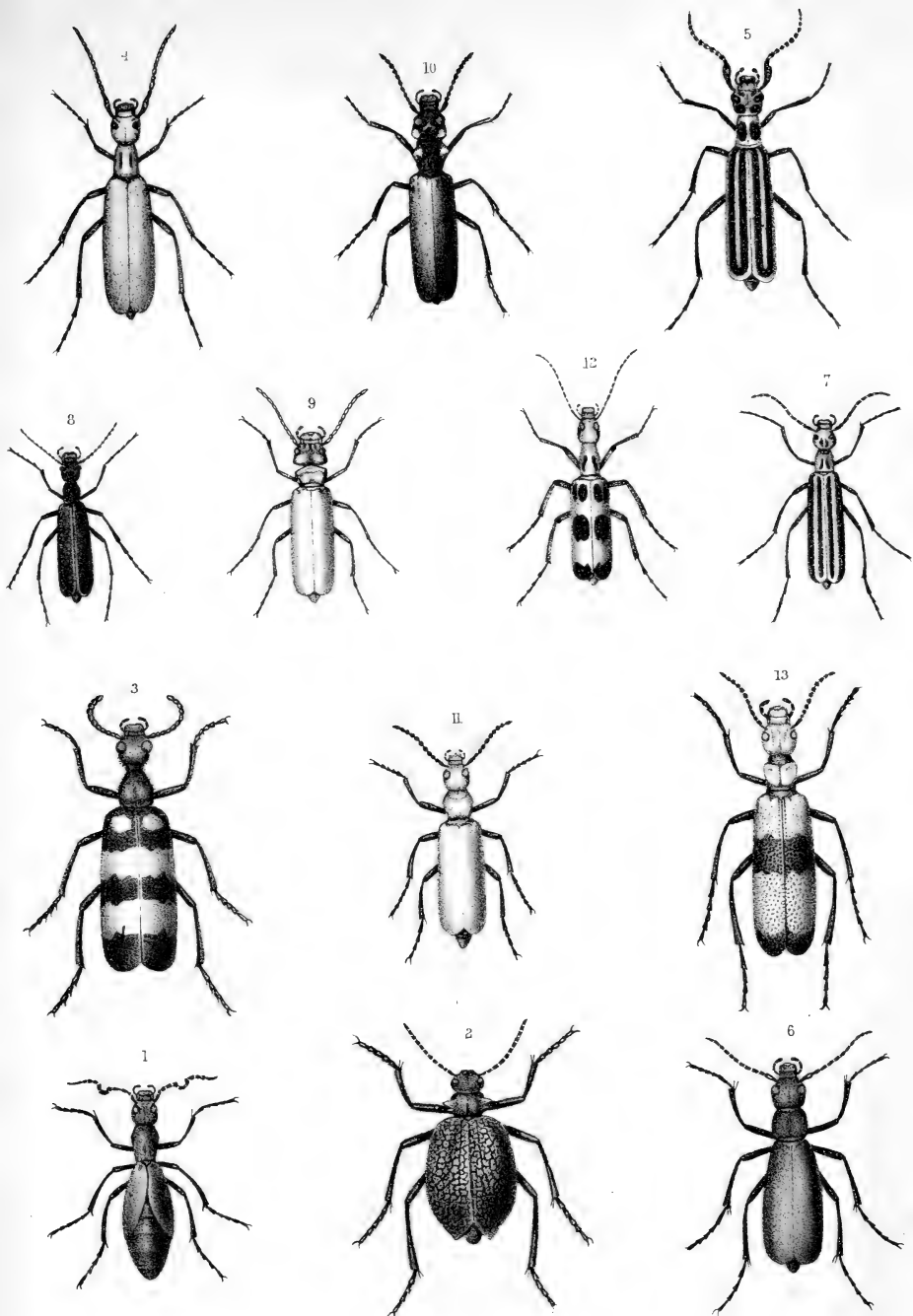
PARASITE ON SAMIA CECROPIA.

DEAR SIR,—

I have this fall obtained upwards of a dozen examples of *Ophion macrurum* from cocoons of *Telea polyphemus* gathered about Oct. 25th and later. Is not this unprecedented?

I have a record from hearsay, but well authenticated, of two cocoons of *Samia cecropia* emerging the *second* summer.

I found late in October *cecropia* cocoons of this year's make, from which some parasite unknown to me had emerged, either through the loose end or through a round smooth hole bitten out of the cocoon, about the diameter of an ordinary lead pencil. The remains in the inner cocoon were mostly small fragments of blackened larval skin, and in one case the entire back of the larva very neatly cleaned. Can any one enlighten me as to the character of this parasite, which is evidently of unusually large size and power. C. E. WORTHINGTON, Chicago, Ill.



1. *Meloe angusticollis* Say.
 2. *Cysteodemus armatus* Lec.
 3. *Mylabris cichorii* Linn.
 4. *Macrobasis albida* Say.

5. *Macrobasis atrivittata* Lec.
 6. " " *segmentata* Say.
 7. *Epicauta vittata* Fab.
 8. " " *cinerea* Forst.
 13. *Tegrodera erosa* Lec.

9. *Cantharis vesicatoria* Linn.
 10. " " *vulnerata* Lec.
 11. " " *nuttalli* Say.
 12. *Pyrota mylabrina* Chev.



The Canadian Entomologist.

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NOTES ON CANTHARIDES.

BY THE EDITOR.

Read at the Recent Meeting of the American Pharmaceutical Association in Philadelphia.

The fact that we have in America several species of Cantharides, as well as some other closely allied vesicating insects which might at any time be used as a substitute for *Cantharis vesicatoria* (the Spanish beetle), has long been known. The species, however, to which attention has heretofore been chiefly drawn are some of the smaller ones found in the more northern parts of the country, especially *Epicauta* (*Cantharis*) *vittata* and *cinerea*, while the larger species south and west have been almost overlooked. The northern species referred to compare very unfavorably in size with the European *vesicatoria*, a feature which adds to the cost of collecting them; it would also appear that this difference of size has often carried with it the impression of a corresponding inferiority. Another bar to their successful introduction has been found in their color. By a strange misconception the presence of the brilliant green particles of the wing-cases in the powdered imported insect, has been associated with their activity, and any sample of powdered cantharides or of prepared emplastrum, where these brilliant particles are wanting, would by many physicians be at once condemned. The recent introduction of the Chinese beetle *Mylabris cichorii* has done much to remove the latter objection; still, notwithstanding that it has been shown by Prof. Maisch (see Proc. Am. Pharm. Assoc., 1872) that the *Mylabris* is much stronger than *vesicatoria*, yielding, according to his analysis, fully double the quantity of cantharidin, the relative market price of the insects belonging to the two species indicates that popular prejudice still favors the use of *vesicatoria*. Our *vittata* and *cinerea*, when powdered, nearly resemble the *Mylabris* in color.

In the western and southern portions of this continent we have species which are large and abundant, and which there is every reason to believe possess all the activity we need, and the chief object of this paper is to draw attention to this fact, and if possible to acquaint our members with the appearance of these species, and detail their life history and habits as far as they are known, so that those who reside in these more distant regions may be induced to collect them in sufficient quantities to admit of their being thoroughly tested. It is not probable that they would be found in any respect less valuable as vesicating agents than the Spanish beetle.

Through the kindness of Dr. George H. Horn, of Philadelphia, whose extensive contributions to our knowledge of American Coleoptera have made his name familiar both in Europe and America, we have been supplied with much information in reference to the species here treated of; an acknowledgment is also due to Prof. C. V. Riley, State Entomologist of Illinois, for some valuable notes on the habits of these insects. We have also had a lithographic plate prepared by Messrs. Sinclair & Sons, of Philadelphia, under the kind supervision of Dr. Horn, in which each of the species referred to is figured of the natural size, excepting 7 and 8, which are somewhat enlarged. This plate is remarkably well executed, and is probably one of the best plates of Coleoptera ever published; besides the American species, it contains figures of *M. cichorii* and *C. vesicatoria*.

We shall first enumerate the species, giving brief descriptions, as plain and void of technicalities as possible.

1. *Meloe angusticollis* Say.—This insect (see fig. 1 on plate) is of a dark bluish violaceous color, with the head, thorax and wing-cases thickly punctured with minute dots or impressions. The thorax is slender, narrower than the head; feet slightly hairy, with the spines of the legs reddish. Found in the Eastern States and in many parts of Canada; occasionally abundant under stones.

2. *Cysteodemus armatus* Lec.—Entire body bluish black; thorax with a strong lateral spine on each side; wing-cases very convex, and much larger than the abdomen, which they cover, and with very coarse elevated reticulations on their surface. This insect varies greatly in size; the figure represents a medium sized specimen.

Extremely abundant in Arizona and the desert regions of California wherever the greasewood, *Larrea Mexicana*, grows. This insect is not as

good a vesicant as some others ; the proportion of hard tissue in its structure is large as compared with the softer and more active portion, too large, perhaps, to admit of its being of much value.

3. *Mylabris cichorii* Linn.—All parts of this insect are black, excepting the wing-covers, which are of an obscure yellow, with three transverse, black, irregular, undulating bands, the one at the apex broadest. The first band is sometimes interrupted, and occasionally reduced to three or four spots.

Found in abundance in the southern portions of China, and also throughout India, on the flowers of the wild chicory and other composite plants. It is also said to occur in southern Europe, extending from Italy through Greece and Egypt to China. For further details in reference to this insect the reader is referred to an interesting and valuable paper by Prof. Maisch, in the volume of Proceedings for 1872, p. 246.

4. *Macrobasis albida* Say.—All parts of body black, densely covered with minute greenish or yellowish-white hairs. The thorax is slightly longer than wide, the wing-covers broader than the thorax, becoming wider behind, and are densely punctured.

Abundant in Texas, New Mexico and on the plains.

5. *Macrobasis atrivittata* Lec.—Also black ; form more elongated than *albida* ; head thickly clothed with fine black hairs, with a small white space in front of the eyes ; thorax with grayish hairs, with a large black space in the middle ; the wing-covers have black hairs, and their apex and sides are margined with gray ; there is also a moderately broad grayish stripe extending from the humerus to near the apex.

Found in Texas, and is probably quite abundant, but we have not been able to obtain definite information on this point.

6. *Macrobasis segmentata* Say.—This insect is black also, with the segments of the body beneath margined with whitish. The thorax is nearly as broad as long, and its posterior edges are grayish. Wing-covers finely punctured and sparsely covered with short black hairs.

Occurs with *M. albida*, and is also abundant.

7. *Epicauta vittata* Fab.—The head of this species is of a light reddish color, with darker spots ; antennæ black ; thorax black, with three yellow lines ; wing-covers black margined with yellow, and with a yellow stripe down the middle. Abdomen and legs black, covered with grayish hairs.

Is found throughout the United States and Canada, but more abundant northward and westward of the Carolinas, extending to near the base of the Rocky Mountains. In the south it is replaced by *lemniscata*, a species closely resembling *vittata*, but differs in having another white stripe. This species has been tested, and has been found fully equal to *vesicatoria* as a vesicant.

8. *Epicauta cinerea* Forster.—Black, closely punctured, and clothed with grayish hairs; beneath clothing dense, upper surface variable. Head sparingly hairy. Thorax densely punctured, sometimes entirely covered with gray hairs, often with a large triangular central space black, divided by a grayish line along the middle. Wing-cases finely punctured, and either entirely grayish or margined with grayish all around.

Occurs all over the United States east of the Rocky Mountains, and in many parts of Canada. In the Southern States it becomes larger, with the wing-cases entirely gray; fully equal in strength to *vesicatoria*.

9. *Cantharis vesicatoria* Linn.—Color, above and below, a beautiful shining golden green; head, thorax and wing-covers closely punctured; antennæ black.

Found most abundant in Spain, Italy and the south of France; also found in all the temperate parts of Europe, and in the west of Asia.

10. *Cantharis vulnerata* Lec.—Body black; head orange yellow, sometimes with a broad black stripe down the middle; wing-cases black.

Extremely abundant throughout the entire Pacific region west of the Sierra Nevadas. Dr. Horn has seen bushels of this insect in some localities literally strewn the ground; also very common on a species of *Baccharis*; he has experimented with them and found them powerfully vesicant, and producing strangury very readily when taken internally in the form of tincture.

11. *Cantharis Nuttalli* Say.—Head deep greenish or golden green; antennæ black; thorax golden green with a polished surface, and a few small scattered punctures. Wing-cases golden purple, striped with green. Body beneath green, polished; thighs purplish, feet black. This large and beautiful insect is extremely abundant in Kansas and Colorado.

12. *Pyrota mylabrina* Chev.—Entire body and legs dull ochre yellow. Thorax with two, sometimes four black spots; wing-covers with three transverse black bands, divided in the middle by the suture, the anterior one being sometimes further divided into four spots; knees and feet

black. Found from Kansas to Mexico, and is abundant throughout the whole region.

13. *Teragrodera erosa* Lec.—Body and legs black; head and thorax reddish, the former with a deep groove; wing-covers bright yellow, their surface roughened with coarse reticulations, with a median and apical black band, which in some specimens are wanting. Abundant in Southern California and peninsula of Lower California, on a low herbaceous plant with a blue flower.

In all these species the female is more valuable than the male, especially when well distended with eggs, owing to the relatively larger proportion of the soft parts. Eggs have the same power as the other soft parts; the blood Dr. Horn believes to be more active than any other portion.

Having referred in detail to the perfect insects, it is now proposed to sketch their history as far as known through the earlier stages of their existence.

The life history of *Meloe*, which has been well worked up in Europe, may be taken as a type of all the species mentioned, since all the facts accumulated on this subject point to a similarity in the character of the transformations and habits, which in the vesicating insects are very remarkable.

In the 20th volume of the "Linnean Transactions" there is a memoir on the natural history of *Meloe*, from which many of the following facts are derived.

The *Meloe* beetles, when fresh from their pupa cases in spring, are feeble, move slowly, and have their bodies small and contracted, but after feeding a few days these enlarge greatly, the abdomen of the female expanding to twice its original size owing to the enormous quantity of ova within its body in process of development. The abdomen will then measure an inch or more in length, and appears to be dragged along with difficulty. They are fond of basking in the hot sunshine, and are said to be most active during the early and middle parts of the day. When confined in boxes for the purpose of observing their habits, it is necessary to expose them much to the sun and supply them with an abundance of food; they are then quite at home, and their proceedings may be easily watched. They drink freely of water and require their food to be well wetted. In a few days after leaving their winter quarters they pair.

The eggs are deposited in the earth. A small excavation is made by the female, sometimes as much as two inches in depth, into which, when

finished, she projects her body with the head just perceptible at the entrance. After remaining in this position ovipositing for about two hours, the body is withdrawn and the earth raked with her feet into the hole until it is entirely closed. These burrows are commonly made among the roots of grass in a dry soil and a sunny spot, often on the margins of a dry footpath. The female always deposits two and sometimes three or four separate layings of eggs, at intervals of from two to three weeks. The first is always the most abundant, amounting usually to three or four thousand. After each deposit the abdomen seems to be almost entirely emptied; the insect then feeds voraciously, and fresh ova are soon developed.

The eggs when first deposited are about one-twentieth of an inch in length, slightly conical, obtuse at both ends, and of a bright orange color. They are placed in such a way that they may be parallel to each other, and adhere together at their sides, with one end directed to the entrance of the burrow. The duration of the egg stage is greatly influenced by temperature, averaging from four to five weeks.

From the egg there escapes a little active, agile creature, somewhat resembling a *pediculus* in habits; in fact, the larva of one of the European species was described by so eminent an Entomologist as Kirby, in 1802, as *Pediculus melittæ*. This young larva, a magnified illustration of which is given in Fig. 49,* is of a bright yellow color, and of an elongated form, with fourteen segments. The three segments which constitute the trunk are strong and powerful, for the attachment of the legs, which are furnished with sharp pointed claws, especially adapted for clinging securely to any object. The anal segment on its under surface is developed into a pair of short prolegs. It moves with great celerity with its six true legs; it can also make use of its anal prolegs, and thus climb a nearly smooth and vertical surface.

The young larvæ of most insects, if food is not supplied to them within a day or so of the time of their escaping from the egg, will die of starvation, but these young creatures will live from two to three weeks without food and maintain their activity, a wonderful adaptation to the circumstances in which they are placed. When hatched they crawl to the

Fig. 49.



* The small outline alongside shows this larva of the natural size.

surface and run up the stems of various plants, and often lodge themselves in the flowers and there await the visits of bees and other insects who alight to collect pollen or honey. They watch their opportunity, and attach themselves with great readiness to any of these insects who may come within their reach. It is astonishing with what celerity they fasten themselves to their victims the instant any part of its body is accessible, and with what tenacity they adhere to it, seizing it by the leg, wing, or hairs of the body, and crawling up and adhering around the insertion of its legs between the head and thorax or the thorax and abdomen, exciting the greatest possible uneasiness in the winged insect, who vainly endeavors to detach them from its body.

Some observers are of opinion that the parasite draws nourishment from the bee on which it fastens, but the main object of this instinctive attachment seems to be to get access to the cells in which the young and food are stored. Once here, the young larva of *Meloe* is said to attack the larva of the bee or other hymenopterous insect whose nest is thus invaded, and being furnished with strong mandibles, they thrust them into the soft parts of their victims, and prey on their substance through the wounded integuments, while the young bee is nourished with the stored pollen and honey. In this state, having no longer any use for their active limbs, they are gradually reduced to mere tubercles, and after a change of skin, the once active and sprightly creature assumes the form of a thick, fleshy maggot. In this form it continues to feed on the young bees or the bee bread and honey stored for their use, and after passing through some remarkable changes while in the larval condition, first changing to a semi-pupa, then to another form of larva, it subsequently assumes the true pupa state, in which condition it remains in its snug retreat until the following spring, when it bursts its bonds and appears as a beetle.

The young *Meloe* larvæ often attach themselves to the hairs of insects which construct no cells and do not store up food for their young; and in such cases, which must be very numerous, they necessarily perish. In the light of this fact we can appreciate the importance of the great fecundity of the females.

The larva of *Cantharis vesicatoria* is almost identical in form with that of *Meloe*, but soon after escaping from the egg it changes from a yellow to a darker hue, and finally to a deep black.

The history of our American species is as yet very fragmentary. Dr. Packard has observed the larva of *Meloe angusticollis*, and found it to differ

but little from its European congeners. Prof. Riley has made some observations on *Epicauta vittata*. He describes the eggs of *vittata* as follows: Length 0.08 inch, five times as long as wide, elliptical and so uniform in diameter that it is difficult to say which is the anterior end, though there is a slight difference. Egg sometimes very slightly curved. Color very pale whitish yellow, smooth and shining.

The young larva is yellowish-brown, borders of head and thorax and of joints somewhat more dusky than general surface; tip of jaws and eyes dark brown. Legs and venter paler; venter not corneous except at sides and across segments eleven and twelve. About ten stiff hairs visible superiorly on the posterior border on the middle segments, with a cone-like prominence at the base of each and six minor bristles in front of them. There are also rows of fainter ventral bristles.

The curious history of these insects throws some light on the fact that while in some localities they are enormously abundant one season, they will be very scarce another. It is to be expected that there would be an alternation between the abundance of certain species of hymenopterous insects and Cantharides. When the insects they prey on are abundant the blistering beetles multiply amazingly, and during this immense multiplication exhaust the stock of material on which they feed to such an extent that a year of great abundance in any given locality can scarcely fail to be followed by a season of corresponding scarcity. In other, and sometimes adjacent localities, where the same causes have not operated to a like extent, the insects may be common enough. The great abundance of the sociable and solitary bees in the great plains of the West will probably always afford food sufficient to admit of the maturing of large broods of Cantharides.

AGENCY FOR THE EXCHANGE AND SALE OF COLEOPTERA.

Mr. E. P. Austin, of Cambridge, Mass., has established an agency for the exchange and sale of Coleoptera. Parties having Coleoptera which they desire to dispose of, either in exchange for other species or for cash, should write Mr. Austin.

ON SPECIES OF CATOCALA.

BY A. R. GROTE,

*Director of the Museum, Buffalo Society Natural Sciences.**Catocala simulatilis* Grote.

The male is now taken by Mr. Jas. Angus. The species is larger than *obscura*, agreeing with it in tone and in the white fringes of hind wings; it may be distinguished by the strongly marked median lines of primaries with a deeper toothing. The lines in *obscura* are thread-like, inconspicuous, and with shallower indentations. The opinion expressed that *simulatilis* is the ♀ of *obscura* must be the result of error; as I remarked at the time of describing the species, such a sexual variation would be without a parallel in the genus. *Residua* is distinguished from *obscura* and *simulatilis* by its blackish fringes to the hind wings.

Catocala flebilis Grote.

There occurs a variety of *C. resecta* with shaded fore wings, which may be mistaken for *C. flebilis*, which has peculiar pearly ash fore wings with the outer margin more oblique. Whether Mr. Strecker has figured a variety of *resecta* for *flebilis* is uncertain from the coarseness of his figure. This suffusion of the primaries occurs in *amatrix* among the red-winged species (Group 3).

Catocala Angusi, n. s.

♂ ♀. Six specimens received from Mr. Angus belong to a new form with black hind wings and blackish fringes, except at apex. It belongs then with the series of *C. insolabilis* and *C. residua*, and is similarly sized. It may be distinguished from *residua* by its paler, evenly grayish primaries and by the t. p. line having a longer costal tooth, as in *simulatilis*. Lines distinct; subreniform open. From *insolabilis* it varies by the want of the bright blue gray tint of fore wings and the absence of the darker shade on internal margin. It varies by having in some specimens a basal black shade, and again another from reniform to below apex. Behind the t. p. line its last sinus is usually a blackish shade. Beneath the body is white and the wings as in allied forms, with the outer white bands very narrow. One specimen has the black suffusions very broad, the ground color of the wing very pale gray, and the subterminal gray band distinct, as it usually

is in *residua*. The latter species may be known by the deeper tone of primaries from base to subterminal line. The fore wings in *Angusi* are not dusky as in *residua*, *simulatilis* and *obscura*, but slightly greenish gray, not very bright.

Catocala mira Grote.

This form is mentioned by Prof. Snow. It is as large as *polygama*, without determinate greenish or brown shades on fore wings. Lines black; t. a. more denticulate than in the three allied forms, *crataegi*, *polygama*, *pretiosa*. The pale shade over the sub-reniform from costa is without dark irrorations, distinct. The primaries are pale, more gray and smoother than in contrasted forms. The hind wings are of a deeper yellow, bands very similar, while the internal margin is notably free from dusky hair and scales. Beneath the black band is broader than in its allies. I do not think that any of these four forms now intergrade. They may be considered as distinct "species."

Catocala cerogama, var. *Bunkerii*.

This form of *cerogama*, received from Mr. Robert Bunker, has the band on secondaries extremely narrow and the yellow basal shade entirely lost. On the fore wings the median space is deeply brown tinted, setting off the white sub-reniform.

Catocala habilis, var. *basalis*.

Differs from the type in the presence of a basal black ray on primaries. On hind wings the median band is broader; the fringe is medially scalloped in black. The terminal inflection of the t. p. line on primaries is deeper and more distinctly black marked. The form seems to be a little larger than the type. Specimens received from Mr. Robert Bunker, taken about Rochester, N. Y.

In studying the black-winged series we may divide them by the fringes in sub-groups.

Fringes white :

- | | |
|-----------------------|-------------------------|
| 1— <i>epione</i> . | 6— <i>desperata</i> . |
| 2— <i>sappho</i> .— | 7— <i>retracta</i> . |
| 3— <i>agrippina</i> . | 8— <i>flebilis</i> . |
| 4— <i>lacrymosa</i> . | 9— <i>simulatilis</i> . |
| 5— <i>viduata</i> . | 10— <i>obscura</i> . |
| | 11— <i>Robinsonii</i> . |

Fringes blackish :

12—*Levettei*.

15—*residua*.

13—*insolabilis*.

16—*tristis*.

14—*Angusi*.

It is somewhat strange that there are as yet no black-winged species known from California. One is described from Siberia, *C. dissimilis* Bremer.

Catocala relictæ.

In my first general paper on the North American species of *Catocala* (Proc. Ent. Soc. Phil., Jan., 1872), the brief notice of *C. relictæ* includes the statement that "the narrow central fascia of the secondaries is pure white." Up to this time I find no notice of a distinct powdering of blue scales which edge this fascia (more noticeably sometimes about the middle of the wing) on my present examples. It is not easy to see these blue scales at first, but the attention once directed to them, they become apparent. This discovery leads me to compare more closely our species with the European *fraxini*, which it is held to "represent," and which has the central fascia of the hind wings entirely bluish. The European species seems to be larger than *relictæ*; the transverse posterior line less perpendicular, more deeply notched and more outwardly exerted opposite the cell, with more prominent teeth. Above the primaries are evenly dusted with dark scales in *fraxini*, and consequently more unicolorous; the darkest specimens of *relictæ* evidently owe their color to a spreading of transverse blackish shades, the ground color, however narrowed, being white. The edge of the hind wings is white in *relictæ*, gray in *fraxini*. Beneath both the species are pure white. The similarity of the under surfaces in these two species led me to reflect on the fact that in the Noctuidæ variation seems to be shown first on the upper surface of the primaries; it will be recollected that these are the more often exposed. There is, then, more white on *relictæ*, on both wings; the central and principal portion of the fascia on the hind wings being pure white. With a large material in all stages it would be interesting to more fully compare the two species, which have probably a common origin. It is interesting, meanwhile, that the blue color is retained in both forms, although in one it may not always be expressed. If the two species had a common parentage, the blue color has been affected most probably by the different surroundings of the now separated forms.

The fact that the under surface in *fraxini* is bright and white as in *relicta*, while the upper surface of the wings is more obscure than in the American species, is worthy of note. I think that if we may localize the features of variation in markings as occurring first on the upper surface of the wings, especially on the primaries, we may draw some conclusions as to the relationship between different species of Noctuidæ from the degree of similarity beneath. I have elsewhere shown that the variability of *C. relicta* in the tone of the fore wings is not a sexual character.

NOTES ON SOME OF THE GENERA OF MR. SCUDDER'S "SYSTEMATIC REVISION."

BY THEODORE L. MEAD, CORNELL UNIVERSITY, ITHACA, N. Y.

After reading Mr. Peabody's paper in the August number of the CANADIAN ENTOMOLOGIST, I determined to verify some of the measurements given as characterizing Mr. Scudder's genera, as it seemed hardly possible that many of the numerical relations there given should prove absolutely constant; and after examining a large number of species and specimens, these relations proved variable beyond all expectation. The measurements of the venation were taken directly from the wings by the aid of a thin sheet of transparent gelatine ruled with lines $\frac{1}{16}$ of an inch apart, the wings having been bleached by Mr. Dimmock's admirable process.

Recently I have carefully gone over the measurements of the same specimens, of the groups *Lycaeides*, *Glaucopsyche* and *Cyaniris*, with a microscope, measuring by means of an eye-piece micrometer and mechanical stage to the nearest thousandth of an inch, and find that the former measurements coincide sufficiently with these to warrant confidence in accepting the remainder as substantially correct.

The results prove that the venation of the wing is very variable even in specimens of the same species, and that no generic distinctions whatever can be based on slight differences in the proportionate length of the cell and wing, or the origin of the first and second branches of the subcostal nervures of primaries.

I have reduced the proportions of these parts mentioned by Mr. Scudder to percentages, so that comparison will be easy. The species

of Lycænidæ examined were as follows: Of *Lycæides*, *anna*, *melissa*, *acmon*, *Scudderii*; of *Glaucopsyche*, *lygdamas*, *oro*, *Couperii*; of *Cyaniris*, *pseudargiolus* (6), *violacea* (5), *neglecta* (2), *lucia*; of *Everes*, *comyntas* (4).

In the first place, the 1st superior branch of subcostal is given as arising in *Everes* at 50 per cent. +, of the distance from base to apex of cell. I find it to vary from 50. to 54.5. In *Lycæides* it should arise at 67.; I find 52.2 to 59.8. In *Cyaniris* the Revision gives "scarcely $\frac{2}{3}$ " (67.—); I find 55.7 to 64. In *Glaucopsyche* it should arise "somewhat beyond the middle" (50. +); I find 57.8 to 63.1. The reader will notice how these numbers overlap each other, thus totally failing to give any distinction between the groups.

The second branch of the same nervure should arise in *Lycæides* at 50 per cent. of the distance between the 1st superior and 1st inferior branches; I find 44.8 to 47.4. In *Glaucopsyche*, also 50 per cent., my results being 37.7 to 46.9. In *Cyaniris* this nervure should arise at "less than half way from base to apex of cell" (50 per cent.—); I find 43.4 to 51.9, and in *Everes* instead of 25., I find 30. to 33. In this last case the numbers do not overlap, probably because only one species (4 specimens) of *Everes* was examined, since the variation among individuals in the other groups is very considerable, and this is the only instance of the kind that I have found in comparing the venation of these genera.

Again, in length of cell as compared to length of wing, *Everes* varies from 43. to 49. per cent. (Revision gives 50.—); *Cyaniris* from 47.3 to 52.2 (Revision gives 50.); *Lycæides* from 47.3 to 48.9 (Revision gives 50 +), and *Glaucopsyche* from 49.3 to 51.1 (Revision gives 50 +).

I have adduced these *Lycaenas* since the published article tabulates their differences, but Mr. Peabody has kindly forwarded me advance sheets of a similar arrangement of the characters of other groups, and there the variation is perhaps even more striking than with the Blues.

In the table giving the distinctions whereon are based the genera *Speyeria*, *Argynnis* and *Brenthis* of Mr. Scudder, taking up every character *seriatim*, we find, first, that the antennæ of *Speyeria* and *Brenthis* are "a little longer than the abdomen," and of *Argynnis* "considerably longer than the abdomen." Taking the length of the abdomen as the unit, I found that the antenna measures in *Speyeria* 1.12 and 1.13, in *Brenthis* from 1.15 to 1.44, and in *Argynnis* from 0.93 to 1.37, which is certainly not in accordance with the characters as given.

The next characters relate to the number of joints of the antennæ,

viz., 52 for *Speyeria*, 41 to 49 for *Argynnis*, and 33 to 34 for *Brenthis*. This matter I have not investigated.

The palpi and eye are compared, the length of the eye being taken as unity; in *Speyeria* they are stated to be 1.50, in *Argynnis* 2— to 2, and in *Brenthis* 2—. I find *Speyeria* 1.29, *Argynnis* 1.07 to 1.60, and *Brenthis* 1.33 to 2.

The fore tibiae are compared with the hind tibiae, being as .33 + in *Speyeria*, .40 ♂ or .40 + ♀ in *Argynnis*, and .50— ♂ or 50 ♀ in *Brenthis*. I find *Speyeria* .36, *Argynnis* .40 to .45, and *Brenthis* .29 to .44.

The tarsi are said to be scarcely shorter than the tibiae in *Speyeria*, in *Argynnis* .75 +; I find for *Speyeria* .80, and for *Argynnis* .80 to .88.

The middle tibiae are said to be "a little shorter than the hind pair" in *Speyeria* and *Argynnis*, "scarcely shorter" in *Brenthis*. I find for *Speyeria* .89, for *Argynnis* .85 to .96, and for *Brenthis* .81 to .93.

The 1st superior branch of the subcostal nervure is said to arise in *Speyeria* "beyond the middle of the outer half of the upper margin of cell" (*i. e.*, at 25 per cent.—, inside apex); in *Argynnis* "in the middle of the outer two-fifths of the upper border of cell" (*i. e.*, at 20 per cent. inside apex); and in *Brenthis* "shortly before the apex of the cell." For *Speyeria* I find 22.1 and 24.; for *Argynnis* a range of from 13.5 to 23.6, and for *Brenthis* from 2.6 to 17.5. In a single species of *Argynnis*, viz., *atlantis*, I find in 10 specimens taken at random the surprising variation of from 14. to 23.6.

The next character is the only one among all those given for these three genera that I have been able to verify from specimens, and even here the variability is startling.

Mr Scudder gives the second branch of the subcostal as arising in *Argynnis* at "half way between the 1st and the apex of the cell" (*i. e.*, at 50 per cent.) and in *Brenthis* as at a similar distance beyond it (*i. e.*, at 100 per cent. beyond). For *Speyeria* no corresponding character is given. I find in all specimens which I have examined that this 2nd branch is given off in *Argynnis* within the apex, and in *Brenthis* beyond it, but the precise point varies in *Argynnis* from 55.6 to 15.0 per cent. within apex, and in *Brenthis* from 114. to 1500. per cent. beyond it, Mr. Scudder's unit (the distance between the origin of 1st branch and apex of cell) being adopted.

The last characters relate to the length of cell, which the Revision

gives for *Speyeria* as 40 per cent. of length of wing, for *Argynnis* as "considerably less than" 50, and for *Brenthis* as "nearly" 50. The measurements give for *Speyeria* 40.5 to 46.1, for *Argynnis* 39.3 to 47.6, and for *Brenthis* 39.7 to 48.7, the average of the 26 specimens of *Argynnis* being 44.5, and of the 13 of *Brenthis* 44.1.

Hence we find that out of all the characters given in the Revision as separating these three genera, there are none that divide *Speyeria* from *Argynnis*, and but a single peculiarity separating *Argynnis* and *Brenthis*, and that sometimes varying fifteen hundred per cent. from the numerical ratio assigned to it, leaving out of account, for the present, the number of joints in the antennæ, which I have not been able to investigate as yet. In venation and length of cell, *Euptoieta claudia* agrees with *Brenthis*, being about midway between *bellona* and *myrina*, so that though we might be inclined to accept this character as sufficiently separating *Argynnis* and *Brenthis*, the latter group would need further limitation to exclude *Euptoieta*. The Melitæas and Phyciodes also have the second branch outside the cell.

A table is appended giving these measurements reduced to percentages, for *Speyeria*, *Argynnis* and *Brenthis*, showing how extremely variable the species and individuals are, and that such proportions are not in any wise to be depended on even for specific characters. A large number of measurements have been made in the genera *Phyciodes* and *Melitea*, but these results must be reserved for a later paper, since their reduction and comparison will require considerable time, and since a number of additional measurements remain to be made in order to complete the series.

TABLE.

<i>Length Antenna.</i> (Abdomen = 1.)	
A. atlantis.....	.93
A. aphrodite.....	1.06
A. Bremnerii.....	1.08
A. aphrodite..	1.11
S. idalia.....	1.12
"	1.13
A. cybele.....	1.13
B. bellona.....	1.15
A. atlantis.....	1.21
A. cybele.....	1.21
B. myrina.....	1.21
A. aglaia.....	1.24
A. aphrodite	1.26
"	1.33
B. euphrosyne.....	1.37
B. freya.....	1.42
B. epithore.....	1.44

The Revision gives
 Speyeria.....“a little longer.”
 Argynnis..... “
 Brenthis.. “considerably longer.”

—
Length Palpi.
 (Eye = 1.)

A. cybele.....	1.07
A. Bremnerii.....	1.17
S. idalia.....	1.29
B. myrina.....	1.33
A. atlantis.....	1.40
B. bellona.....	1.43
A. aphrodite.....	1.50
B. euphrosyne.....	1.56
A. aphrodite.....	1.58
A. aglaia.....	1.60
B. epithore... ..	1.75
B. freya....	2.00

The Revision gives
 Speyeria.....1.50
 Argynnis.....2— to 2.
 Brenthis.....2—.

—
Length Fore Tibia.
 (Hind Tibia = 1.)

B. bellona.....	.29
B. myrina.....	.29
S. idalia.....	.36
B. epithore.....	.37
B. freya....	.37
A. Bremnerii.....	.40
A. aphrodite.....	.41

A. cybele.....	.42
B. euphrosyne.....	.44
A. atlantis.....	.45

The Revision gives
 Speyeria......33 +
 Argynnis......40 or .40 +
 Brenthis......50— or .50

—
Length of Tarsi.
 (Fore Tibia = 1.)

A. cybele.....	.80
S. idalia.....	.80
A. Bremnerii..	.88
A. aphrodite.....	.89

The Revision gives
 Speyeria..... 1.—
 Argynnis......75—

—
Length of Middle Tibia.
 (Hind Tibia = 1.)

B. freya.....	.81
A. atlantis.....	.85
A. aphrodite... ..	.86
B. epithore.....	.87
B. euphrosyne.....	.89
B. bellona.....	.93
B. myrina....	.93
A. Bremnerii....	.95
A. cybele.....	.96

The Revision gives
 Speyeria.....“a little shorter.”

Argynnis....."a little shorter."
 Brenthis....."scarcely shorter."

1st Branch s. c. from apex cell.

(Length cell = 100.)

B. bellona.....	2.6
B. chariclea.....	8.8
B. myrina.....	12.9
B. freya.....	13.3
B. arsilache.....	13.3
A. aglaia.....	13.5
A. aphrodite, var.....	13.6
A. atlantis.....	14.0
B. thore.....	14.3
B. amathusia.....	14.5
B. tricularis.....	15.1
A. Bremnerii.....	15.4
B. epithore.....	15.8
A. atlantis.....	16.1
B. helena.....	16.2
A. atlantis.....	16.7
B. selene.....	16.7
A. atlantis.....	17.2
A. cybele.....	17.2
B. dia.....	17.2
A. Meadii.....	17.4
B. euphrosyne.....	17.5
A. cybele.....	17.6
A. atlantis.....	18.1
A. cybele.....	18.2
".....	18.5
A. atlantis.....	18.7
A. aphrodite.....	18.9
A. aglaia.....	19.5
A. diana.....	19.5
A. cybele.....	20.0

A. atlantis.....	20.0
A. Edwardsii.....	20.1
A. cybele.....	20.2
A. aglaia.....	20.4
A. Edwardsii.....	21.2
A. atlantis.....	21.3
S. idalia.....	22.1
A. atlantis.....	22.2
A. cybele.....	23.1
A. atlantis.....	23.6
S. idalia.....	24.0

The Revision gives

Speyeria.....	25.—
Argynnis.....	20.
Brenthis.. "shortly before apex."	

2nd Branch s. c. from apex cell.

(Distance 1st Branch to apex = 100.)

	Inside
A. atlantis.. ..	55.6
A. aphrodite, var.. ..	50.0
A. atlantis	48.0
A. Meadii	47.4
A. cybele	44.4
A. atlantis.. ..	44.4
A. aglaia	42.9
A. Edwardsii	42.9
A. atlantis	41.7
A. cybele.. ..	39.1
"	38.7
A. Edwardsii	38.5
A. aglaia	36.4
A. cybele	35.8
A. atlantis.. ..	35.8
A. cybele	34.8

A. diana.. 33.3	A. diana ..	42.6
A. cybele	33.3	B. arsilache ..	42.9
A. atlantis	33.3	A. cybele ..	43.2
“	28.6	B. selene ..	43.4
A. aphrodite	28.0	A. cybele ..	43.4
A. Bremnerii.. ..	25.0	A. atlantis ..	43.5
S. idalia.. ..	23.5	B. chariclea ..	43.6
“	22.2	B. helena ..	43.6
A. atlantis	20.0	B. epithore ..	43.7
A. aglaia	20.0	A. cybele ..	43.8
A. atlantis	19.0	“ (2) ..	43.9
“	15.0	“ ..	44.1
	Beyond	A. Edwardsii ..	44.2
B. euphrosyne ..	114.	A. atlantis ..	44.3
B. dia	146.	B. dia ..	44.4
B. thore	150.	S. idalia ..	44.4
B. arsilache.. ..	162.	A. atlantis ..	44.4
B. selene	182.	B. tricularis ..	44.6
B. helena.. ..	191.	A. aphrodite, var ..	44.7
B. epithore	200.	A. Meadii ..	44.7
B. tricularis.. ..	240.	A. atlantis ..	44.9
B. freya	244.	“ ..	45.0
B. myrina	250.	“ ..	45.3
B. amathusia ..	282.	“ ..	45.5
B. chariclea.. ..	433.	A. Bremnerii ..	46.0
B. bellona	1500.	S. idalia ..	46.1
The Revision gives		A. atlantis (2) ..	46.2
Argynnis.. ..	50. inside	A. aglaia ..	46.6
Brenthis	100. beyond	B. thore ..	46.7
		A. aglaia ..	46.7
<i>Length of Cell.</i>		A. atlantis ..	47.6
(Length wing = 100.)		B. euphrosyne ..	47.6
A. Edwardsii.. ..	39.3	A. aphrodite ..	47.6
B. myrina	39.7	B. bellona ..	48.7
S. idalia.. ..	40.5	The Revision gives	
A. aglaia	41.3	Speyeria	40.0
B. amathusia ..	42.2	Argynnis “considerably less than”	
B. freya.. ..	42.5	50.	
		Brenthis ..	“nearly” 50.

MISCELLANEOUS.

Mr. W. H. Edwards, of Coalburgh, W. Va., wishes to know how far north the black variety of *turnus*, female, is found, and also how it compares in abundance with the yellow variety at the west and south. We trust that some of our readers will be able to supply the needed information.

J. C. Wasserman, 50 Beverley Terrace, Cullercoats, England, wishes to exchange British Lepidoptera for Canadian; parties desirous of exchanging will please write him.

Wm. Barnes, Decatur, Illinois, wishes to exchange insects from Decatur for Canadian insects, and with this view will be glad to correspond with Canadian collectors.

Mr. H. K. Morrison, of Cambridge, Mass., has been engaged during the past summer in collecting the insects of Southern and Middle Georgia and of the Black Mountains of North Carolina (6,700 feet high), the latter a region hitherto unexplored. He has succeeded in obtaining a large series of insects of all orders, especially Lepidoptera and Coleoptera.

CORRESPONDENCE.

OBSERVATIONS ON SPHINGIDÆ.

My summer's experience with the larvæ of rare Sphingidæ is, that *Smerinthus astylus* Westwood, *Smerinthus myops* Harr., *Darapsa versicolor* Clemens, and *Darapsa choerilus* Walk. are all double brooded. A characteristic of *astylus* is its caudal horn, which is armed with two spines at its tip, appearing bifurcate at first glance. These spines are constant from its hatching. Color of horn, dark brown at tip and base; pale green in centre*, pointing forward. The long life in its larval condition, and consequent exposure, may in a measure account for its exceeding great rarity. Have fed some from six to seven weeks.

Smerinthus myops.—I have found that the red blotches on larvæ are not uniform, and are more prevalent on the late brood, although some are entirely green and correspond in color to similar spots found on the leaves of the wild cherry at that season.

Darapsa versicolor.—Caudal horn points backward, is straight until the last moult, when it assumes a fine curve to the rear. Color of curved

* At last moult the dark brown is faded to an extremely light shade.

horn, black above, orange beneath. The larva presents two colors, pale green and brown, which are not sexual distinctions. Eggs of all pale green, slightly flattened.

GEO. W. PECK, New York.

NOTES ON VANESSA LINTNERII, FITCH.

In 1856, Dr. Fitch described a butterfly allied to *Antiope*, and named it in honor of its discoverer, J. H. Lintner.

A butterfly was captured here last summer that is nearly as far removed from *antiope* as *Lintnerii*. I copy Dr. Fitch's description, and point out the differences. He says: "This butterfly is closely related to *antiope*, or white bordered butterfly. Its wings have perfectly the same form and are similarly colored to those of *antiope*, but their pale border is twice as broad as in that species, occupying a third of the length of the wings, and it is wholly destitute of the row of blue spots which occur in *antiope* forward of the border."

The specimen before me differs from the one described by the Doctor in two respects: the wings are shorter proportionally than in *antiope*, and shaped more like those of *Vanessa f-album*. In the second place, the lobes or tails of the hind pair of wings are larger and not as pointed as those of *antiope*. Again, the Doctor says its ground color is deep rusty brown, much more tinged with liver reddish than *antiope*; the fore margin of the anterior wings is black, freckled with small transverse white streaks and lines, but is destitute of the two white spots which are seen in *antiope*. My specimen has the white spots mentioned by the Doctor, but they are small and not well defined. The specimen before me coincides with the remainder of Dr. Fitch's description, which is as follows:

"The broad outer border is of a tarnished pale ochre yellow hue, speckled with black the same as in *antiope*, and becomes quite narrow at the inner angle of the hind pair of wings. The wings beneath are similar to those of *antiope*, but are darker and without any sprinkling of ash gray scales or any whitish crescent in the middle of the hind pair, and the border is speckled with gray whitish in wavy transverse streaks, without forming the distinct band which is seen in *antiope*."

ROBERT BUNKER, Rochester, N. Y.

ERRATA.—On page 160 of present volume, 15 lines from bottom, "P. O. Zeller" should be P. C., and 3 lines from bottom, "since he," &c., should read "since—." This sentence has no reference to Mr. Scudder, which by an error of the printer it is made to have.

On page 213, 17 lines from bottom, for *Hypsaphalus* read *Hypocephalus*.

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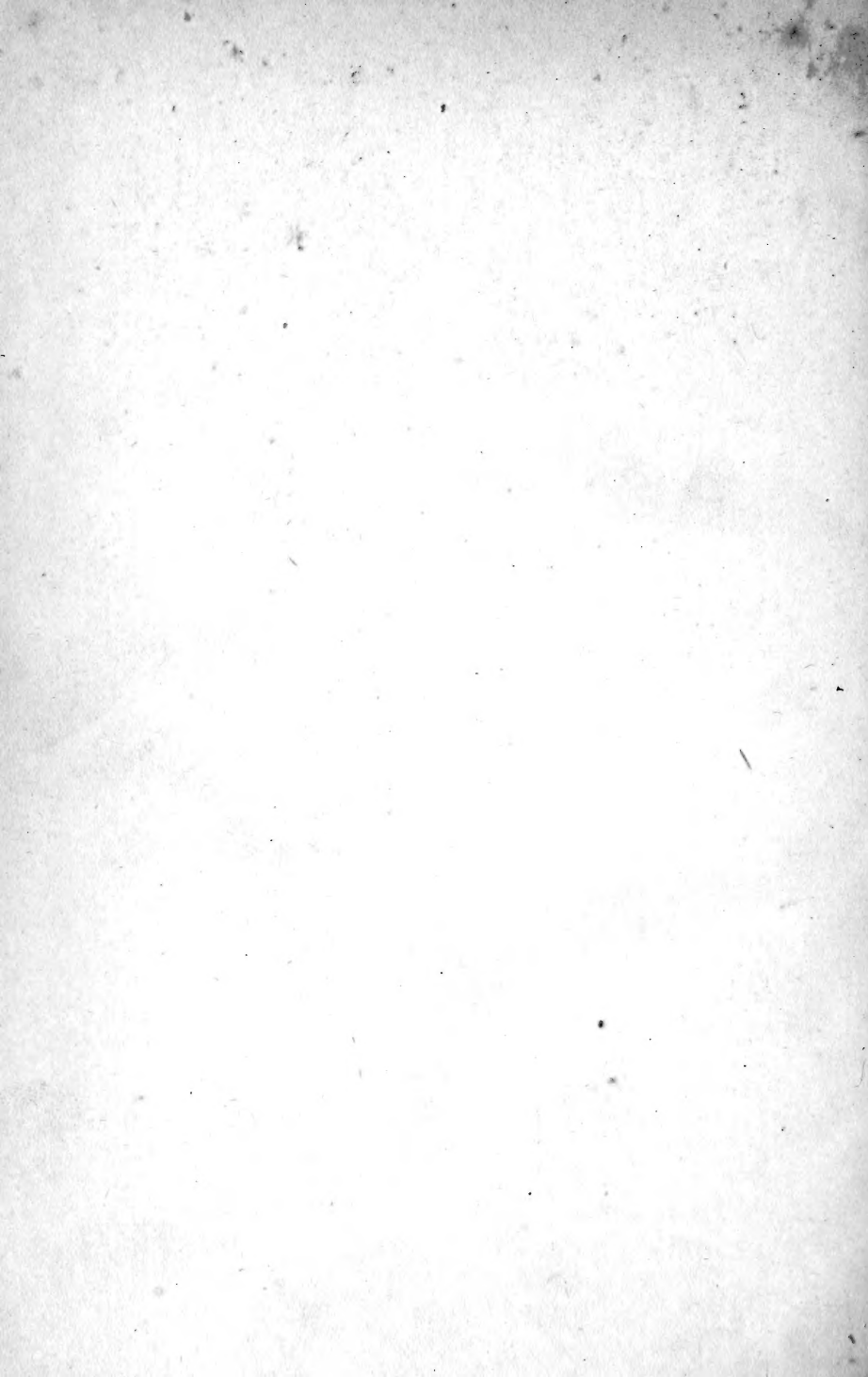
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